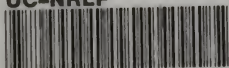
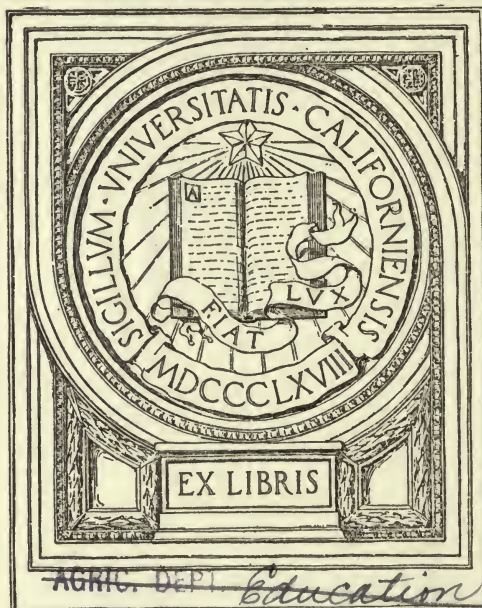


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The
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Bulletin

ELEMENTARY VOCATIONAL AGRICULTURE
FOR
MARYLAND SCHOOLS

F. L. Griffin

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Wm. L. Garrison

MARYLAND AGRICULTURAL COLLEGE
DEPARTMENT OF AGRICULTURAL EDUCATION

ELEMENTARY VOCATIONAL AGRICULTURE
FOR
MARYLAND SCHOOLS

By

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Specialist in Agricultural Education
States Relations Service, U. S. Department of Agriculture

LESSONS OUTLINED BY MONTHS

This publication was prepared by the States Relations Service U. S. Department of Agriculture, in coöperation with the Maryland Agricultural College and the Maryland State Department of Public Education.

Inquiries relative to this publication should be addressed to the Maryland Agricultural College, Department of Agricultural Education, College Park, Md.

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ELEMENTARY VOCATIONAL AGRICULTURE FOR MARYLAND SCHOOLS.

LESSONS OUTLINED BY MONTHS.

By E. A. MILLER,

Specialist in Agricultural Education.

SEPTEMBER.

Introduction.

This is the first of a series of publications, one for each school month, setting forth lessons in elementary vocational agriculture for the public schools of Maryland. These lessons are outlined after a monthly sequence plan and are intended to be adapted to the seasonal, agricultural, and school conditions of Maryland. It is hoped that by presenting lessons in the subject of agriculture at the time the principles in these lessons are practiced or should be practiced on the farms of the community two things may be accomplished; namely, the classroom work may be greatly vitalized by having timely material at hand for practical work and the things that are best to do on the community farms are taught at the time they should be done.

The lessons are developed quite fully, but in addition to this references are made to the textbooks most commonly used in the State as class assignments and to the available publications of the United States Department of Agriculture and the Maryland Agricultural College as teachers' reading. By carefully studying the reference literature the teachers are able to supplement the lessons outlined to the advantage of the pupils.

After making a careful study of school conditions in the State it is recognized that only a limited number of lessons in agriculture can be taught by the greatly burdened teachers, hence these outlines contain ordinarily two, and never more than three lessons a week. It is considered advisable to combine the sixth and seventh grades in agriculture and some other subject as physi-

ology, and alternate the lessons in these subjects. That is, when two lessons in agriculture are provided for a week, assign three lessons in physiology, and when three lessons in agriculture are provided, assign two lessons in physiology. In this way the work may be carried on and still not overburden the teacher's schedule.

The practical exercises suggested take the direction very largely of club activities or home projects. It is urged that the teachers emphasize this phase of the work and in making up class records give it equal weight with the recitation grade. Teaching agriculture and correlating it with other subjects cannot be made effective unless the pupil demonstrates the principles taught in some kind of farm project and utilizes the project experiences in vitalizing the other subjects in the school course.

The correlation exercises set forth in connection with each lesson are largely suggestive. These are intended to indicate how the teacher may take advantage of the experiences and problems the pupils meet with in their club or project work to give vitality to the subjects of English, arithmetic, geography, history, drawing and the like.

LESSON ONE.

Subject: SOIL.

Topic: Winter Cover Crops.

Purpose.—During the summer and early fall much unused plant food is made available in the soil by the action of bacteria or small plant life organisms. If such soil is left unprotected during the fall and winter months the weathering agencies leach out and wash away this available food. There are certain hardy plants that may be grown on the land during the fall, winter and early spring. These utilize the available plant food, protect the land from washing by forming a mass of roots in the soil and a coat on its surface, provide grazing for farm animals during the fall and early spring and return plant food to the soil when plowed under in the spring.

Kinds of Cover Crops.—There are two general classes of cover crops adapted to Maryland conditions; namely, small grains and grasses such as rye, barley, oats, wheat and timothy, and legumes,

such as crimson clover and vetch. In all sections of the State where wheat and grasses are grown they form a winter cover for the land. These crops usually follow corn or sod. Rye, barley, oats, vetch and crimson clover may be used as a winter cover for land that has produced a crop of corn, tomatoes, potatoes or the like. Rye, barley and vetch are preferable in western and northern Maryland, and crimson clover and oats in the southern portions of the State.

Dates of Seeding for wheat and timothy range from the middle of September in the mountain section to the first of November in the southern parts of the State. The same is true of rye, barley and oats. Crimson clover and vetch should be sown at least a month earlier where practicable to do so.

Rates of Seeding.—Wheat and timothy: wheat 1 to $1\frac{1}{2}$ bushels, timothy 10 pounds; rye 1 to $1\frac{1}{2}$ bushels; crimson clover 12 to 20 pounds, depending on the date of planting. The later the planting, the more seed should be used. Vetch 25 to 30 pounds with $1\frac{1}{4}$ bushels oats, $\frac{1}{2}$ to $\frac{3}{4}$ bushel rye, or $\frac{3}{4}$ to 1 bushel wheat.

Methods of Seeding.—Wheat and timothy, rye, vetch and grain, barley, oats, and clover should be seeded with a grain drill—one-horse if in standing crop, two-horse if on open land. When crimson clover is hand seeded the land should be previously prepared and the seed should be lightly covered.

Inoculation.—If crimson clover and vetch are sown in fields that have not produced these crops before, inoculation is necessary to insure the success of the crops. Take soil a spade deep from fields that have produced these crops and broadcast it over the fields to be seeded at the rate of about two bushels of soil per acre and harrow in immediately to prevent sunlight killing the bacteria.

Textbook References.—Burkett, Stevens and Hill, pp. 192, 213, 215, 249, 254; Davis, p. 148; Nolan, p. 44; Buffum and Deaver, pp. 83, 95, 97, 114, 118.

Teachers' Reading.—Farmers' Bulletins Nos. 326 and 427.

Practical Exercises.—(1) Take pupils of the class to nearby field where a leguminous crop is growing. Carefully remove plants from the soil. Note: (a) the mass of roots, (b) the nodules or tubercles. Examine in the same way one of the plants that does not belong to the leguminous group. Note the difference and emphasize the fact that nodules are the homes of

the bacteria that collect nitrogen, the most expensive element of plant food.

(2) Require each pupil of the class to bring to school at least one each of leguminous and non-leguminous plants. Examine and compare the root systems and the nodules produced.

Correlations.—Language: have each pupil of the class write a description of a leguminous plant including such points as, depth to which roots grow, appearance of nodules, height of plant, kinds of blooms, seed cases and seeds, if any. (See Department Bulletin No. 132.)

Drawing: Sketch roots of leguminous plants showing the tubercles.

Geography: Trace the water that falls on the farms of the community into the branches, creeks, and rivers on to the sea. If cover crops are not sown the farms along the streams are enriched at the expense of those of the community.

Arithmetic: Develop problems on the cost of the seed used at the homes of the pupils in sowing cover crops. Base the calculations on the rates of seeding suggested in this lesson and on local prices of seed.

LESSON TWO.

Subject: GREEN FEED.

Topics: (1) Silage, (2) Forage Crops.

Crops Used.—Corn is the principal crop employed in making silage but it may be supplemented by such fallow crops as peas and soybeans.

Stage of Cutting Crop.—Corn for silage should be cut somewhat earlier than for grain. The grains should be dented and slightly glazed, but soft enough to be pressed in with the thumb. The time for cutting is indicated by the shucks beginning to turn brown. Peas and soybeans may be cut any time after they begin putting on pods.

Chopping the Materials.—All materials should be cut into lengths from $\frac{1}{4}$ inch to $\frac{1}{2}$ inch long. Finely chopped silage admits of thorough packing. This excludes the air and insures keeping qualities. The most economical type of silage cutter is one that is connected with a blowing device. This forces the silage into the silo as it is cut.

Packing the Silage.—One or two men should be stationed inside of the silo to pack the silage thoroughly as it is forced in. Special care should be taken to see that the packing is done thoroughly around the walls. If cutting is deferred until the material becomes dry, three or four buckets of water to each load should be sprinkled on silage as it is being packed. The air must be very largely excluded if the silage is to be preserved uniformly.

Fitting Doors and Covering Silage.—The doors should be covered with a sheet of building paper and forced firmly into position. When the silo is quite full a covering to exclude the air should be provided until it is time to begin feeding the silage. Fine trash or chaff well moistened and sowed down with some oats forms a mat that excludes the air.

Feeding Silage.—After the silo is opened not less than two inches of silage should be fed each day. Five square feet of surface should be fed to a cow each day. If silage around the walls of the silo becomes frozen, it should be piled up in the middle to thaw.

Forage Crops.—If the instructions given in the lesson on cover crops are followed fall and spring grazing is provided for. In western and northern Maryland the wheat stubble may be utilized for light fall grazing. Both rye and crimson clover provide grazing for the early spring months.

Hay is provided in those parts of the State where timothy and clover are grown. Alfalfa is one of the most valuable hay crops and August and September are the months for seeding in all of Maryland except the mountain section. Midsummer seems to be the best time for sowing alfalfa in the mountain section. One of the best crops to precede alfalfa is potatoes. A thoroughly prepared compact seed bed is necessary to successful seed germination and early growth. A previous application of lime at the rate of from one to two tons per acre is necessary. If the soil has not grown alfalfa very recently it should be inoculated. Broadcast over the field from 200 to 500 pounds of soil per acre from an alfalfa or a sweet clover field. Liberal quantities of acid rock phosphate and muriate of potash should be applied at the time of seeding.

Textbook References.—Buffum and Deaver, pp. 79, 87; Nolan, pp. 321, 326; Davis, 97, 109; Burkett, Stevens and Hill, pp. 238, 244.

Teachers' Reading.—Farmers' Bulletins Nos. 292, 339, 509, 515, 550, 578 and 589. The teacher should supplement the foregoing lesson with timely notes drawn from reading.

Practical Work.—(1) The teacher should take the pupils to a nearby farm where silage is being made. Pupils should take notes on the several steps in making and storing silage, using the following questions as a guide: (a) In what state is the corn? (b) What is the average length of the particles? (c) How is the silage forced into the silo? (d) How is it packed? (e) Other points of interest?

(2) Are there silos at the homes of any members of the class? If so, have the pupils from those homes report in writing replies to the foregoing questions.

Correlations.—Language: Have pupils provide themselves with well-bound note books. Transcribe the silage notes in this book.

Drawing: Make sketches of the different plants being used in the community for making silage, such as corn, peas, and soybeans.

Arithmetic: One cow consumes the silage from 5 square feet of surface to a depth of 2 inches each day. What should be the diameter of a silo to feed a herd of 10 cows? 15 cows? 20 cows?

If the silage is fed an average depth of 2 inches per day what should be the height of a silo to feed a herd 120 days? 150 days? 180 days?

If silage weighs an average of 35 pounds per cubic foot, how many tons in a silo 10 feet in diameter and 20 feet high? 14 feet in diameter and 30 feet high?

LESSON THREE.

Subject: CROPS.

Topic: Selecting Seed Corn.

Select in the Field.—Corn should be selected in the field (a) to be able to determine the character of the stalk, its location with reference to other stalks, and the number and character of ears it bears and (b) to select and mark ears so that they may not become mixed with the general crop at harvesting time.

The Stalk.—The stalk (fig. 1) from which seed corn is to be selected should be one that approaches nearest the ideal under average field conditions. Do not be misled by an attractive,

symmetrical, highly productive stalk that happens to have good distance or an unusually fertile spot. Select the plant that has outstripped its neighbors under average conditions of distance and soil fertility. The stalk should be thrifty and of average height, strong and tapering, have strong brace roots and an abundance of leaves. It should bear at least one good ear located at a medium height—not too high nor too low, possessing



FIG. 1. UNDESIRABLE EAR SHANK TOO SHORT. DESIRABLE FOR SEED.
FOR SEED. FAIR STALK.

moderately long shanks to enable the ear to point downward as it matures, close fitting shuck and well covered tips.

The Ear.—The ear (fig. 2) should be 9 to 11 inches long and its average circumference should be three-fourths the length. The cob should be medium sized, the rows of kernels should be straight and running well out to the tip and butt of the ear. The kernels should be long, approximately wedge-shaped, firmly set in place, and true to type as to denting and color.

Storing Seed.—When corn is being husked and hauled in from the fields care should be taken to collect in separate piles the marked ears, that is, if the corn is shocked. If it is left standing to mature, the marked ears should be collected in sacks as the corn is being harvested. The selected corn should then be raked and stored where it will not be exposed to extremes in temperature, excessive moisture, and attacks of insects, rodents and the like. If farm buildings are not equipped with a room

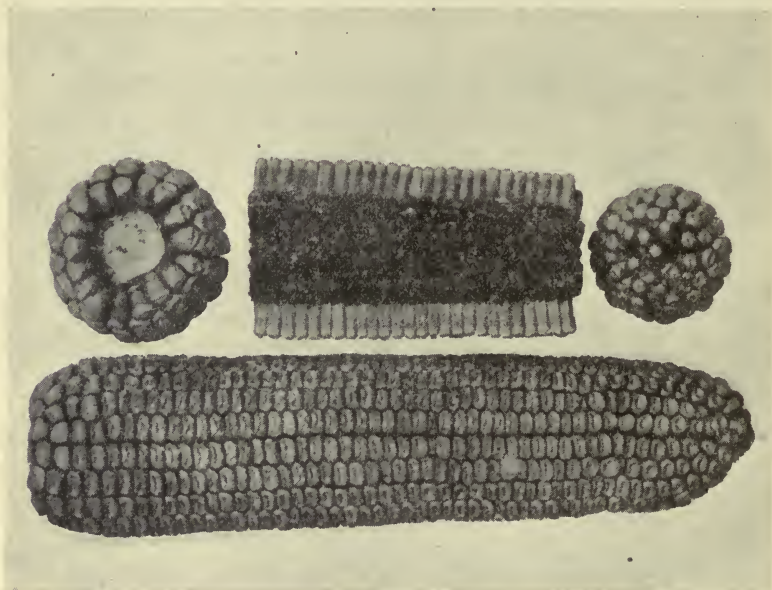


FIG. 2. IDEAL EAR, SHOWING TIP, BUTT AND PROPORTION OF COB TO GRAIN.

especially prepared for storing seed, the ears should be so raked that they may be suspended from points inaccessible to small animals. If at any time weevils or grain moths appear take the corn down, place it in a barrel and fumigate it with carbon bi-sulphide. The carbon bi-sulphide should be in a small dish and this placed on top of the corn in the barrel. Cover the barrel and let it stand for forty-eight hours. At the end of this time uncover the barrel and thoroughly air the corn. Take care that there is no fire near when the barrel is opened.

Textbook Assignment.—Nolan, Lesson 14; Burkett, Stevens and Hill, Section 19; Davis, pp. 131–138; Buffum and Deaver, Lesson 23.

Teachers' Reading.—Farmers' Bulletins Nos. 313, 415 and 537.

Practical Exercises.—(1) Teacher and pupils take trip to some club member's acre or nearby field. Select stalks and mark ears. (2) Have each member of the class bring to school a well-selected ear for study. Answer the following questions: What is the length of each ear? Circumference? Are the rows of kernels straight and do they extend out to the tip and butt? What is the shape of the kernels? Are they set firmly? Is the cob large, small or medium in size? All club members should select their seed corn this month.

Correlations.—Language: Require each member of the class to write up an account of the field trip. Also copy in the note book facts learned about the ears of corn studied at school.

Drawing: Make drawings of ideal and improper ears, ideal and ill-shaped grains.

Geography: Locate on the map the principal corn producing States and compare them with Maryland as to latitude, longitude and other agricultural industries.

History: Organize a boys' corn club and write to the Maryland Experiment Station and the United States Department of Agriculture for literature on corn club work.

Arithmetic: By selecting seed for three years in succession a corn club boy increased his yield 10 bushels per acre the third year. The time spent in selecting seed during three years was fifteen hours. What was the value of his time per hour if corn sells at 70 cents per bushel?

Have each club member in the class measure off a plat 20 feet by 20 feet in his acre of corn, count the stalks and ears and with these facts as a basis calculate the yield per acre.

LESSON FOUR.

Subject: Hogs.

Topics: Plan for Seasonal Pasture.

Pork can be produced much cheaper if pastures or forage crops are used along with corn and other feedstuffs. Blue grass is one of the most valuable pasture grasses for Maryland conditions.

However, blue grass is not found on every farm, and even when it is there are periods during the growing season when it should be supplemented with temporary grazing or forage crops.

(To teacher: Have each pupil make a copy of the accompanying chart and study it carefully.)

SUCCESION OF CROPS FOR HOGS

FEEDING DATES	LOT I	LOT II	LOT III
<i>First Year.</i>			
April 1-May 1.	{ Crimson clover and rye.		
May 1-July 1.	.....	{ Winter barley. Winter oats. Vetch and red clover. Alsike, Alfalfa.	
July 1-Aug. 15.	.....	.....	{ Rape or cowpeas sown separately or together.
Aug. 15-Dec. 15.	.....	Red clover.	
Sept. 15-Dec. 15.	Corn.		

Second Year.

April 1-May 1.	{ Crimson clover and rye.		
May 1-July 1.	.....		{ Winter oats. Winter barley and red clover.
July 1-Aug. 15.	Rape or cowpeas.		
Aug. 15-Dec. 15.	.....		Red clover.
Sept. 15-Dec. 15.	.....	Corn.	

Third Year.

April 1-May 1.	.....	{ Crimson clover and rye.	
May 1-July 1.	{ Winter oats. Winter barley. Vetch and red clover.		
July 1-Aug. 15.	.....	Rape or cowpeas.	
Aug. 15-Dec. 15.	Red clover.		
Sept. 15-Dec. 15.	.....		Corn.

The foregoing chart provides for a three-year rotation in temporary pastures. By utilizing this plan grazing crops are made available for every month in the year except January, February and March. The area of each lot in the rotation depends upon the number of pigs to be kept. One acre of good soil should support ten to fifteen hogs.

All the crops provided for should be planted in the latter part of August and September, except corn, peas and rape. These, of course, should be planted after the grazing period in the spring. The first column of the chart shows the dates on which the crops immediately opposite are ready for pasturing. The second, third, and fourth columns show the crops to be grown on each of the lots during the three years.

Teachers' Reading.—Farmer's Bulletins Nos. 331 and 411; Maryland Agricultural Experiment Station Bulletins Nos. 150, 174 and 185. The teacher should supplement the foregoing lesson with timely notes from the suggestions found in these bulletins.

Practical Work.—Pig club members should prepare for winter and spring grazing during this month. If only one pig is to be raised, a small amount of forage will be necessary. But if it is the purpose of the club member to grow a spring litter of pigs forage crops for spring and summer grazing should be seeded now. Adapt the suggestions in this lesson to the needs of the individual case.

Correlations.—Language: Have the pupils copy in their note books the pasture plan given in the foregoing lesson.

Drawing: Draw to scale three grazing lots of an acre each. Have them lie side by side. Show the location of lanes and gates arranged conveniently for transferring hogs from one to the other.

Geography: Iowa, Illinois, Missouri, Indiana, Nebraska, Ohio, and Kansas are the seven States leading in the production of hogs. Locate these States on the map. What are the leading crops grown by these States. Is there any relation between the crops grown and raising hogs?

History: Organize a pig club. Emphasize the fact that corn club members should be pig club members so that profitable rotations may be practiced. Secure a copy of Farmers' Bulletin No. 566. Write to the Maryland Experiment Station for literature relating to clubs.

Arithmetic: Based on local prices find the cost of the material necessary to enclose the three pasture lots outlined in the drawing exercise. Set posts 8 feet apart and use 30-inch hog wire.

LESSON FIVE.

Subject: THE ORCHARD.

Topic: Gathering Apples.

Importance.—The work of the orchardist is by no means at an end when his apples are ready to harvest. In fact the methods of gathering as well as of marketing the apples have as much to do with the profits realized as the methods of growing.

When the Apple Should Be Picked.—This is an important matter. To the grower too early or too late may mean failure. If picked too soon the fruit are undersized, poorly colored and inferior in quality. If allowed to hang on the tree too long the keeping and shipping qualities are impaired. Early picking reduces the danger from windfalls, yet on the other hand apples color better when left on the trees comparatively late. The time for picking red apples is generally judged by their color, and that for green apples by the color of their seeds. The latter is one of the most reliable indications of ripeness. A winter apple picked just as the seeds have turned a light brown and before they become dark around the edges is found to have not only full flavor, but also good keeping qualities. Red apples are frequently left on the tree after the seeds indicate maturity to allow them to take on more color. Bright days and frosty nights bring out color rapidly, even to fruit grown on the shady side of the tree. Some varieties such as Stayman's Winesap, Ben Davis' and Paragon may be left on the tree to good advantage, while Wealthy, Wagner and Rome would drop. Jonathan should be picked as soon as well colored or it will not keep in storage. Much of the complaint lodged against the Jonathan for not keeping well in storage is probably due to late picking.

Picking the Fruit.—The way from the orchard to the market is likely to be a bumpy one and unless properly safeguarded the apple receives bruises that depreciate its value. Apples should be picked carefully. They should not be jerked or shaken off the tree. Such action destroys fruit spurs and injures the fruit.

If the stems are pulled out or the skin broken rot fungi are likely to enter and the keeping qualities impaired. The hand should grasp the apple firmly but gently, with the thumb pressing the stem against the side of the fruit, then with a sharp bend the stem unjoints from the fruit spur. The apple should then be laid in the receptacle, not thrown or dropped.

Receptacles.—Buckets, baskets, bags or aprons are in general use. The padded half-bushel basket with swing handle and wire hook to hang on limbs is probably the best. In case of apron or bag the weight is continually on the picker and there is also danger of bruising the fruit while pushing or leaning against the limbs or ladder.

Textbook Reference.—Nolan, pp. 60–64; Davis, pp. 200–201; Buffum and Deaver, pp. 167–169.

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletin No. 144; Farmers' Bulletin No. 113.

Practical Exercises.—(1) Take a trip with the class to observe a progressive farmer gathering apples. Require the pupils to take notes on the observations. Note the ladders and receptacles used and the manner in which the fruit is removed from the spurs. Are the apples over-ripe, under-ripe, or in the proper condition? (2) Have members of the class bring to school several varieties of recently picked apples. Study them to give the pupils practice in recognizing varieties; to determine whether or not they have been properly picked and whether or not they are at the proper stage of ripeness.

Pupils having home project or club work with apples should make reports on their methods of picking apples. Write to the Maryland Experiment Station for literature on apple clubs.

Correlations.—Language: Require pupils to write out in full the notes taken while visiting the orchard and those taken in connection with the study of the different varieties at school. Carefully copy these in the note books.

Drawing: Make sketches of the different kinds of receptacles used in the community for gathering apples.

Geography: Locate on the map the principal markets for the apple crop of the community.

History: Study the principal varieties of apples grown in the community, as dates when introduced, dates of ripening, success with which grown and keeping qualities.

Arithmetic: Have pupils of the class report the yields of the orchards at the homes of the pupils and from these facts develop problems. Compare varieties as to yields.

LESSON SIX.

Subject: VEGETABLE AND FRUIT GARDENING.

Topics: (1) The Home Garden. (2) Small Fruits.

The Home Garden: Saving Seeds.—Many garden plants are maturing seed this month, hence it is the proper time to select for future planting. Select plants (fig. 3) that are well developed



FIG. 3. IDEAL PLANTS AND CHOICE FRUIT FROM WHICH TO SELECT SEED TOMATOES.

and healthy under normal conditions, but not those having enjoyed abnormally favorable conditions. When the fruit is fully matured or the seed thoroughly ripe carefully pick the best specimens. Dry seeds are easily shelled out and stored. Pulp specimens like the tomato should be crushed in a suitable vessel and let stand for a few days until they ferment. Then fill the vessel with water and let stand a few hours to settle. The pulp will rise to the top and can be poured off with the water, leaving

the seed in the bottom. The seed should be given a second washing by adding water, letting it stand as before, and then pouring it off. The seed should now be placed on a fine sieve or a thin cloth and let dry. Take care to put the seed where mice or birds cannot get it. When the seed is dry put it in thin cotton bags and hang up in a warm dry room to insure thorough drying. Glass jars are very satisfactory for permanent places in which to store vegetable seeds.



FIG. 4. a, SECONDS; b, FIRSTS; c, WELL ARRANGED AND WELL CRATED.

Planting Fall Vegetables.—Spinach, kale and turnips may yet be sown in the southern counties of the State. Sow Jersey Wakefield cabbage seed that plants may be had for fall setting. Also sow Big Boston lettuce to secure plants to be grown in the cold frame. A cold frame can be constructed at very little expense and by its use a supply of lettuce may be provided through a large part of the winter. Prepare the ground for setting fall cabbage. An abundance of well rotted manure should be plowed in.

Small Fruit.—Fall bearing strawberries may be picked every two or three days through this month. Great care should be exercised in picking (fig. 4) and packing. The fruit stems should be pinched off carefully without bruising or even pressing on the berry with the hand. The baskets should be clean, new and well filled with berries. It pays to put a good product in good condition on the market.

The final picking should be followed by mowing the patch and burning the grass as soon as it is sufficiently dry. This destroys foul matter, fungous diseases and insects. Plow between the rows throwing the furrows together in the middle and thin the plants. Cultivate the ground level between the rows.

Grapes to sell well on the market must present an attractive appearance. Hence extreme care should be exercised in handling. The bunches should be removed with picking shears and should be handled by the stem to avoid destroying the "bloom." After picking the grapes should be carried to the packing shed and all green and defective berries should be removed. So fill the basket that some pressure must be applied to bring the lid in place.

Textbook References.—Buffum and Deaver, pp. 154 and 185; Davis, pp. 173, 196 and 199.

Teachers' Reading.—Farmers' Bulletins Nos. 154, 471, 255, and 198; Maryland Agricultural Experiment Station Bulletins Nos. 160, 182, 180 and 116.

Practical Exercises.—(1) Have pupils bring to school choice specimens of tomatoes, cucumbers, and mature beans. Select those specimens that are suitable for seed and store them. (2) If fall strawberries and grapes are grown in the community accompany the pupils to a nearby farm and give them practice in picking and arranging in baskets. If practicable have berries brought to school and give pupils a practical lesson in arranging them in baskets.

Correlations.—Language: Have tomato club members submit written reports as to their work for the year.

Drawing: Tomatoes, strawberries, cucumbers, and grapes in cluster supply excellent drawing material.

Geography: If any one of the before mentioned vegetables or fruits is grown in the community for the market answer the following questions: Is there a farmers' marketing club? What is the shipping point? To what market shipped? Is the fruit

or vegetable utilized by a local cannery? Trace on the map the route the shipment takes from the community to the market.

History: Have each pupil of the class write an account of the introduction, development and the success with which any one of the before mentioned crops has been grown in the community. Organize tomato clubs.

Arithmetic.—Have the pupils gather data at their homes with reference to the foregoing crops as to quantities sold and prices received. From these develop problems adapted to the advancement of the pupils. Problems should also be developed from reports of tomato club members.

LESSON SEVEN.

Subject: POULTRY.

Topic: Houses.

Site.—The house (fig. 5) should be situated in a convenient place as the chickens require attention several times during the day. A rich, sandy, well drained soil is best. If the ground is damp the chickens are subject to roup, rheumatism, and the like. If it is wet and muddy the hens soil their eggs with dirty feet. A southern or southeastern slope of the land should be chosen if possible as such a site is naturally warmer, and also protected from the north winds.

The House.—The house (fig. 5) should be so constructed as to be convenient to the attendant, cheerful to the birds, dry, well ventilated, free from draughts, and should be economical of construction. The styles of poultry houses are: colony, and long or continuous. Colony houses are used most. They are so called because they shelter one flock or colony. They may be made portable. This admits of their being moved from one place to another and reduces the likelihood of disease. There are three kinds of floors used: dirt, board or cement. Sometimes a dirt floor is inclined to be damp. In this case a layer of coarse material like rocks or broken bricks must be put in to keep the earth floor dry. The same is true if cement is to be used on a damp site. The advantages of a cement floor are that it can be cleaned easily and lasts well. A dirt floor is cheap and furnishes a dust bath for the birds, but it is hard to clean and diseases are sometimes bred in the filth. A board floor is very good except that rats may get under it and cold winds sometimes blow up

through it. A simple way to construct the walls is to use a single layer of boards with paper on the outside. A double wall with air space between is sometimes used. This latter, however, is most always damp. There are several kinds of roofs, but the most popular one is the shed roof. It is simple to construct, inexpensive, and if made high in front light is admitted and room is provided for the poultry attendant to move about freely. The rear should be made low for too much air space in a house makes it cold in winter. The size of the house depends upon the number of birds to be housed. Four square feet of floor space



FIG. 5. POULTRY HOUSE ADAPTED TO MARYLAND CONDITIONS.

is about average for each fowl, when small flocks are kept, and they have to be kept inside a great deal.

The Accessories of the poultry house are roosts, nests, food troughs, drinking vessels (fig. 6) and droppings boards. From 6 to 10 inches of roost space should be given each bird. All the roosts should be on the same level to prevent birds fighting for the highest points. Nests should be 10 inches by 12 inches or larger, depending upon the size of the fowls. Ventilation of the poultry houses is very important. A lack of ventilation causes dampness, foul air, and a consequent weakness in the fowls. A large part of the front and the front only should be entirely open.

This permits an interchange of air by diffusion and eliminates the possibility of a draught. Even with this arrangement the house should be at least 14 feet deep and the roosts placed in the rear. On very cold or stormy nights a muslin curtain can be let down over the opening in the front. The feed hoppers and drinking vessels should be convenient, sanitary and of sufficient size.

Textbook References.—Davis, pp. 288–291; Burkett, Stevens and Hill, p. 282; Nolan, p. 110.

Teachers' Reading.—Farmers' Bulletins Nos. 287 and 528; Maryland Agricultural Experiment Station Bulletin No. 171. Supplement the lesson with timely notes.



FIG. 6. a, PROTECTED DRINKING TROUGH; b, PROTECTED FEED TROUGH; c, TYPES OF DRINKING FOUNTAINS.

Practical Exercises.—(1) Make a study of the poultry houses of the community. Have each member of the class report in detail as to the poultry houses at his own home and at the homes of his immediate neighbors. (2) Make a simple drinking fountain after the following directions: With a nail make a hole in the side of a tin can about half an inch from the open end. Fill the can quite full of water and place over it a pan about two inches deep. Quickly invert both. The water should stand in the pan as high as the nailhole in the can. This will show the principle of certain drinking fountains.

Poultry club members should prepare housing facilities and accessories for their flocks.

Correlations.—Language: Require the pupils to make in writing their reports on poultry houses in the community. These reports should be copied in the note books.

Drawing: Require drawings of feed troughs, drinking vessels and other poultry house accessories.

Arithmetic: Find the cost of materials given on pages 90, 92 and 93 of Maryland Agricultural Experiment Station Bulletin No. 171. Have the pupils furnish facts from their homes with reference to dimensions of poultry houses and materials used in their construction. From these develop problems as to cost.

LESSON EIGHT.

Subject: DAIRYING.

Topic: Care and Feed of Fresh Milkers and Young Calves.

Feed.—If the cow is to come in fresh in the fall she should be fed a liberal ration of laxative food during the months of July, August and September, unless she has access to an unusually good pasture. A mixture of bran and corn with the addition of a little linseed meal is recommended.

After the calf is born and cow should be fed a limited amount of sloppy feed such as bran mash with leguminous hay for three or four days. Then gradually bring her to a full feed.

Care.—During the first three or four days the entire flow of milk should not be drawn at one time as milk fever is likely to follow as a result of an abnormal flow of blood to the udder.

If knots or lumps form in the udder they should be carefully removed by rubbing or massaging. In aggravated cases alternate applications of hot and cold water should be applied to the udder.

Milk Fever. Symptoms: (1) The cow becomes apparently paralyzed almost all over the body. This is specially noticeable in the limbs. (2) The head is held at one side seemingly in an effort to see the udder. Milk fever develops in from one to four days after the calf is born.

Treatment: Draw the milk from the udder and pump it full of air using a milk tube and a bicycle pump (fig. 7). When the quarter is well filled with air tie the teat with tape or a strip of cloth to prevent the air escaping. The air should be kept in the udder twenty-four hours or longer.

The Young Calf.—For the first few days the calf should get nourishment from the cow. After this separate the calf from the cow and feed it her milk. The calf should be fed three times a day and be given 1-1½ pounds of milk at each feed. This should be kept up for at least three weeks. The calf may be taught to drink milk by putting his head in the pail and forcing his mouth open with the fingers. After the calf becomes three weeks old whole or skim milk should be continued and this supplemented with corn meal and a good quality of hay. If skim milk is to be fed the change from whole milk should be gradual requiring about a week to make the change. The calf may be taught

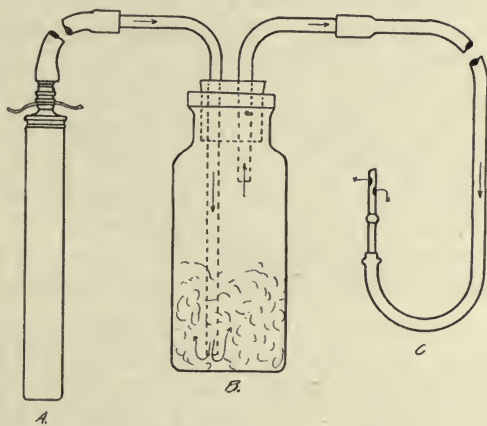


FIG. 7. IMPROVISED APPARATUS FOR TREATING MILK FEVER: A, BICYCLE PUMP; B, BOTTLE CONTAINING COTTON; C, RUBBER TUBING WITH MILK TUBE AT THE END.

to eat meal by rubbing small amounts on its nose. This causes the calf to lick the meal and cultivate a taste for it.

Textbook References.—No particular material is given in the textbooks on this phase of the subject.

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletins Nos. 169, 181; Farmers' Bulletin No. 280.

Practical Exercises.—(1) Let each pupil select a young calf at his or her own home and care for it along the lines suggested in the foregoing lesson. Teach it to drink milk and to eat meal. (2) The care of a calf for a year or longer provides a splendid project for a pupil.

Correlations.—Language and Drawing: Draw and describe the equipment necessary to treat milk fever.

Arithmetic: Develop problems on the amount and value of whole milk necessary to feed a calf until it is three weeks old. Ten calves.

LESSON NINE.

Subject: FLOWER GARDENING.

Topic: Home and School.

Care of Growing Flowers.—The weather is usually fine this month and very little attention is required, but on nights when frosts threaten cover the flower beds and plants.

Preparing for Fall Planting.—Order hardy bulbs such as tulips, hyacinths, narcissi, lilies, crocus and the like. Seeds, cuttings, and rooted plants of biennials and perennials may be ordered now. Prepare the beds for the bulbs and seeds by thoroughly spading and pulverizing the soil. An abundance of manure should be worked into the soil. A well drained site should be selected and the bed well rounded to shed water.

Planting.—Bulbs may be planted this month and later so long as the soil is in working condition. By planting early a good root growth is developed before severe cold weather sets in. Tulips should be set 5 to 6 inches apart and 5 to 6 inches deep; narcissi, 6 inches apart and 4 inches deep; crocus, 2 to 4 inches apart and 2 inches deep. In planting measure from the surface of the ground to the top of the bulb. Bulbs may be used either for beds or borders. Crocus and other low-growing kinds give pleasing effects when planted on the lawn.

Handling Dormant Plants.—Plants that have finished active growth and are through flowering may be lifted and divided. Use a sharp spade or knife in dividing the roots or underground stems and see to it that each division has several eyes or buds. Such plants as the peony should be divided with a knife so that there is at least one bud with each division. The divisions should be reset where wanted. Seeds of biennials and perennials may be sown the latter part of the month.

Textbook References.—Davis, p. 180; Nolan, p. 244; Burkett, Stevens and Hill, p. 108; Buffum and Deaver, p. 260.

Teachers' Reading.—Farmers' Bulletins Nos. 218, 134, 185. Write to the Maryland Experiment Station for plans of home and school yards.

Practical Exercises.—Lay out the flower beds at the school and at the homes. Order seeds, bulbs and plants. Prepare and fertilize the beds and plant.

Correlations.—Language: Have the pupils write letters ordering catalogues and flower seeds.

Drawing: Draw to scale the flower garden locating the different beds and borders.

LESSON TEN.

Subject: MANAGEMENT SUGGESTIONS.

Crops.—Cut and shock corn. This may be done by hand, with the harvester or with any one of a number of corn cutters. The method employed depends upon the amount of corn and the other work to be done on the farm at this season. The proper stage at which corn should be cut is indicated by the bottom blades and the outer husks becoming dry.

Begin sowing wheat this month in the western part of the State. Wheat and vetch or oats and vetch for spring grazing should be sown this month. Either one of these combinations should follow hay stubble and precede corn.

Buckwheat should be harvested when the first grains are matured.

Farm Animals.—This is the month to lay out and start a continuous hog pasture. If a permanent blue grass pasture is not feasible, plan a rotation as suggested in the lesson of this month. A fall crop of rape is possible in the southern portions of Maryland. If there is corn to be hogged down, turn the hogs in the field as soon as the grains have become dented.

All cattle should have access to permanent pastures, sheep should graze the wheat stubble, and a patch of early rye or oats should be sown to provide grazing for poultry.

The wheat stubble should be mowed often so that the growth will be sufficiently tender to be utilized as a hay for wintering live stock. Nothing in the way of forage should be allowed to go to waste.

Horticulture.—Begin gathering apples as they ripen. Those on the outer branches ripen first and should be gathered before they are over-ripe and lose their keeping qualities.

Fall strawberries should be picked as often as every two or three days. Continue picking until frost. Fruiting canes of raspberries and blackberries should be removed. Also clean

out and burn the weeds. Trim out new canes and burn them along with other rubbish.

The fall garden should be given attention. Care for growing plants. Some of the border plants may be sown during the first of September, especially in the southern parts of the State. This is the month to select vegetable seeds.

REFERENCES.

Teachers should provide themselves with the literature referred to in the foregoing lessons. These publications may be had free and much of the value of these lessons is lost if the references are not utilized.

Write the Division of Publications, United States Department of Agriculture, Washington, D. C., for the following: Farmers' Bulletins Nos. 113, The Apple and How to Grow It; 134, Tree Planting on Rural School Grounds; 154, The Home Fruit Garden: Preparation and Care; 185, Beautifying the Home Grounds; 198, Strawberries; 218, The School Garden; 255, The Home Vegetable Garden; 280, A Profitable Tenant Dairy Farm; 287, Poultry Management; 292, Cost of Filling Silos; 313, Harvesting and Storing Corn; 331, Forage Crops for Hogs in Kansas and Oklahoma; 339, Alfalfa; 411, Feeding Hogs in the South; 415, Seed Corn; 427, Barley Culture in the United States; 515, Vetches; 528, Hints to Poultry Raisers; 537, How to Grow an Acre of Corn; 550, Crimson Clover: Growing the Crop; 562, The Organization of Boys' and Girls' Poultry Clubs; 566, Boys' Pig Clubs; 578, The Making and Feeding of Silage; 586, Collection and Preservation of Plant Material for Use in the Study of Agriculture; 589, Home-made Silos; 606, Collection and Preservation of Insects and Other Material for Use in the Study of Agriculture; 617, School Lessons on Corn. Also United States Department of Agriculture Bulletin 132, Correlating Agriculture With the Public School Subjects in the Southern States.

Write to the Maryland Experiment Station, College Park, Md., for the following: Bulletins Nos. 144, Apple Culture; 150, Pig Feeding Experiments and Two Kinds of Hog Houses; 157, Some Experiments with Poultry; 160, Strawberries; 169, Cow-testing Association; 171, Poultry Notes; 174, Hog Cholera; 180, Tomatoes: Varieties, Diseases, Culture; 181, Inexpensive Aids in Producing Sanitary Milk; and 182, Small Fruits.

OCTOBER.

Introduction.

This is the second of the series of monthly publications setting forth lessons in elementary vocational agriculture for the public schools of Maryland. The same plan is followed as in the September issue. Teachers should familiarize themselves with the introductory statement of that number.

LESSON ONE.

Subject: SOIL.

Topic: Managing Manure.

Importance.—Manure is so valuable that much attention should be given to its management. The fact that farm animals are being housed at night makes it necessary to consider this important lesson this month.

Applying Manure to the Soil.—When practicable manure should be spread on the fields as it accumulates. In this way losses from leaching and fermentation are avoided. The three methods commonly employed in putting manure on the field are (1) placing it in heaps about the field and allowing it to remain some time before being spread, (2) broadcasting it and allowing it to lie for a time or plowing it under immediately, and (3) applying it in the hill or drill with the seed. The first method is objectionable because it increases labor, permits fermentation and leaching, and does not admit of uniform distribution. Broadcasting (figs. 1 and 2) is the best practice when the land is level, the soil covered with grass, or the manure can be plowed in immediately. This method insures uniformity of distribution, requires a minimum of labor, and reduces the losses due to fermentation and leaching. Application in the hill or drill is advisable only when the supply of manure is limited and the immediate effect is desired. This method is valuable in forcing truck crops.



FIG. 1. A GOOD METHOD, BUT THE LABOR COST IS TOO GREAT EXCEPT ON VERY SMALL FARMS.



FIG. 2. THE BEST METHOD, BUT THE INVESTMENT IS TOO GREAT FOR VERY SMALL FARMS.

Storing Manure.—When it is impracticable to spread the manure on the soil as it accumulates it should be collected and (figs. 3 and 4) stored. The manure shed should have a good roof and a close fitting or cement floor. As the manure is stored it should be packed firmly.



FIG. 3. A GOOD MANURE SHED WITH CONVENIENT ARRANGEMENT.

Textbook References.—Nolan, pp. 149-152; Davis, pp. 76-81; Burkett, Stevens and Hill, pp. 21-24.

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletin No. 122; Farmers' Bulletin No. 192.

Practical Exercises.—(1) Have the members of the class report the methods being employed at their homes in the manage-



FIG. 4. A WASTEFUL PRACTICE IN HANDLING MANURE.

ment of manure. What lands are receiving the broadcast applications? (2) Club members should begin spreading manure on their plats. An accurate record of the weights of manure applied should be kept.

Correlations.—Language: Have the pupils reduce to writing their reports on the methods of manure management.

Arithmetic:—Develop problems determining the value of manure stored or distributed on the farms represented by the pupils of the class. Show by these exercises that fertilizer saved is money made.

LESSON TWO.

Subject: CROPS.

Topic: Sowing Wheat.

Preparation of Seed Bed.—Fallow land: This is land that has been planted to wheat or grass the preceding year and that has received bare cultivation or has grown a leguminous crop during the summer immediately preceding. Fallow land should be in good tilth if it has been properly cultivated and is now ready for the seed drill.

Corn land: The customary and possibly the best practice in preparing corn land for wheat sowing is to give it a thorough surface tillage with some kind of harrow. In some sections of the state the preference of the farmers seems to be to plow the corn ground. This is generally where the corn fields are likely to be weedy. If the soil is plowed to some depth, the roller should be used to firm it before planting the wheat.

Tobacco, potato, and tomato lands: These crops should be followed by wheat in order that it may gather the excess of plant food left in the soil by these crops which have been highly fertilized. Soils having grown these crops are prepared for seeding wheat by simple surface harrowing.

Fertilizers.—Wheat is a crop that requires a relatively large amount of phosphoric acid. This makes raw bone a favorite fertilizer with wheat growers. Raw bone contains about 22 per cent of phosphoric acid and 4 per cent of ammonia. A good formula for wheat is nitrate of soda 100 pounds, muriate of potash 150 pounds, bone tankage or dried fish 700 pounds, and

acid phosphate 1,050 pounds. An application of from 200 to 500 pounds per acre is the practice. Amounts smaller or larger than these would be unprofitable. The fertilizer should be applied at the time of seeding. Wheat drills have fertilizer compartments.

Selecting and Treating Seed.—To avoid damage from smut seed should be selected from a crop known to have been free from smut and to have been kept clean. But to make assurance doubly sure the seed should be treated with a solution of copper-sulphate (blue stone) or formalin. The copper sulphate solution is composed of 1 pound of copper sulphate to 4 gallons of water. This should be placed in barrels or tubs and the wheat immersed in it for a few minutes. When all kernels are thoroughly wet the grain should be removed and dried. The formalin solution is composed of 1 pint of formalin to 45 gallons of water. The grain should be sprinkled or soaked in this solution until every kernel is thoroughly wet and then removed and dried.

Seeding.—Time: The dates of seeding wheat in Maryland range from October 1 in the mountain section to November 30 in the southern parts of the State. There should have been at least one killing frost before planting to prevent damage by the Hessian fly. If wheat comes up before the Hessian flies are killed by frost, they lay eggs on the young plants. These pass the winter either in the flax seed or larva stage and develop into flies in the spring.

The rate at which seed should be sown depends upon the fertility of the soil, the amount of moisture in the soil, and the time of planting. If the soil is fertile or made so, it produces a larger crop. If the soil is comparatively dry or the date of planting late, more seed should be sown to insure a stand. A regular grain drill should be used in planting. If grass is to follow wheat the timothy seed should be sown at this time.

Textbook References.—Buffum and Deaver, pp. 97, 98; Burkett, Stevens and Hill, pp. 192–197; Davis, pp. 148–150; Nolan, pp. 44–48.

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletin 147; Farmers' Bulletins 507, 596, 640.

Practical Exercises.—(1) Have the pupils bring to school specimens of wheat seed. Examine them carefully separating them into three lots; namely, large, plump kernels; small, faulty kernels; and impurities. (2) Make a collection of the different

varieties of wheat seed being planted in the community. Place a few kernels of each variety in a small bottle and label the bottle. Compare the kernels of the different varieties as to size, shape, and color. See Farmers' Bulletin 586. Which variety has produced the best yield?

Correlations.—Language: Have pupils copy in their class booklets the formulas suggested with which to treat wheat kernels for smut.

Drawing: Make drawings of wheat kernels.

Geography: Locate the principal wheat growing States and countries on the map. Compare them with Maryland as to latitude, longitude, area, and agricultural productions.

History: Wheat was the principal crop of the Nile Valley (Egypt) in ancient times. When the stream overflowed the valley the farmers sowed their grain and the sediment in the water settled down over the kernels and covered them. What is the connection between this incident and the expression "Cast your bread upon the waters, etc.?"

What variety of wheat, if any, has been developed in the community or section? Has it been grown more successfully than other varieties? To what extent have the varieties grown in the community been improved?

Arithmetic: Develop problems determining the cost of solutions for treating wheat seed and the cost of seed wheat being sown on the farms of the community.

LESSON THREE.

Subject: CROPS.

Topic: Judging Corn.

Importance.—One of the greatest factors in the matter of increasing the yield of corn is that of improving the seed. Instead of buying from seed houses the farmers should improve the seed of the variety already adapted to the community. This can be accomplished by knowing good seed and selecting it. Practice in judging familiarizes one with what good seed corn should be like. As the corn in the shock is being husked the ears that were selected and marked in the field should be separated from the general crop. Only the best of the field-selected ears should

be kept for seed and to this end they should be carefully studied or judged.

Judging.—Require each member of the class to bring to school ten ears of corn. Have each pupil to judge the several lots of ears after the accompanying score card.

Explanation of the card.—(1) Trueness to type means that each ear should be similar to an ideal ear of the particular variety. (2) Shape of ear has reference to its being cylindrical and tapering slightly toward the tip. (3) Purity of ear implies that there should be no mixture in the color of grains and that the cob

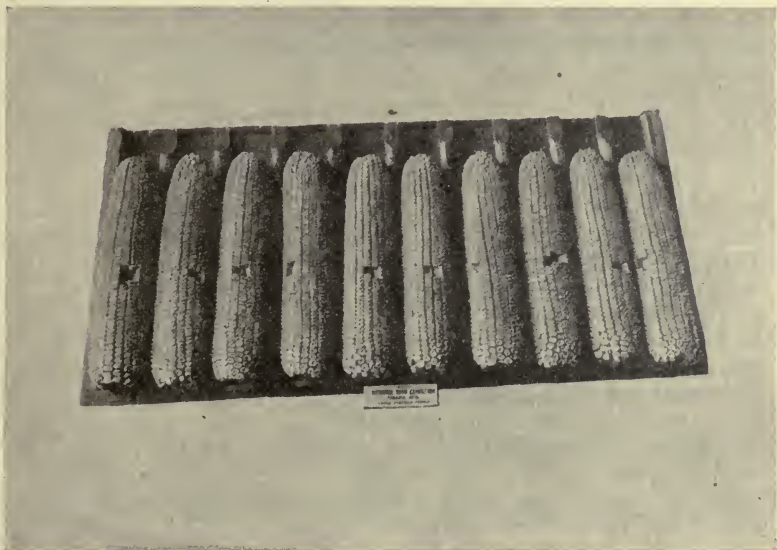


FIG. 5. A PROPERLY ARRANGED EXHIBIT.

should be white if the corn is white and red if the corn is yellow.

(4) Poor vitality is indicated when the husks adhere to the corn, when the tips of the husks are black, and when the kernels are undeveloped and loose on the cob. (5) The tips should be regular, uniform, and properly proportioned with the body of the ear. The rows should extend well out to the end and the kernels should closely resemble those of the main part of the ear. The same in general should be true of the butts. (6) All kernels should be uniform in size and approximately wedge shaped. (7) The

SCORE CARD FOR CORN

Variety.....Exhibit No.....

	PERFECT	SCORER'S	CORRECTED
Maturity and seed condition..... To be of value for grain, corn <i>must</i> mature and produce good, hard seed.	25	.....	.....
Uniformity..... Ears should be alike in shape, size, color, indentation and size of kernel.	15	.....	.....
Kernels..... Flat side, slightly wedge-shaped with large, smooth germ. Edge, with parallel sides and of medium thickness. Not chaffy.	15	.....	.....
Weight of ear..... Dent varieties, as usually planted, pro- duce only one ear per stalk, hence yield per acre depends largely upon weight of shelled corn per ear.	15	.....	.....
Length and proportion..... Varies with locality and variety. Experi- ments show that a continued selection of short, thick ears reduces the yield.	10	.....	.....
Butts..... The base of the ear should be covered with even sized kernels in straight rows which are a continuation of those at the center of the ear. The shank should be large enough to support the ear and no larger.	5	.....	.....
Tips..... Should be covered with kernels of the same depth as—and in rows which are a continuation of—those at the center of the ear.	5	.....	.....
Space between rows..... Should be very slight and in straight lines.	5	.....	.....
Color..... The color of both grain and cobs should be uniform showing trueness to type or strain.	5	.....	.....
Total.....	100	.....	.....

Remarks.....
Name of scorer.....Date of.....

most desirable lengths of ears range from 9 to 11 inches. The average circumference of the ear should be about three-fourths of the length. (8) There should be only slight furrows between the rows of kernels. Space between the kernels on the cob indicates immaturity and poor vitality. (9) The proportion of corn to cob depends upon the depth of kernels, size of cob, maturity, furrows, and space on cob. The proportion of grain should be 86 to 87 per cent and the proportion of cob should be 13 to 14 per cent.

Arranging an Exhibit.—Select ten ears (fig. 5) of the same variety, uniform in size and shape. In the display arrange them in the order of their lengths.

Textbook References.—Davis, pp. 132–138; Burkett, Stevens and Hill, pp. 66–68; Nolan, pp. 49–55; Buffum and Deaver, pp. 107–109.

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletin 141; Farmers' Bulletins 415, 617.

Practical Exercises.—(1) Judging provides practical work. (2) Corn club members should submit a report of their year's work including cost of production, methods of fertilization and cultivation, yield, exhibits made, prizes, and the like.

Correlations.—Language: Have each pupil of the class describe the best ear of corn judged by him.

Drawing: Make sketches of good and poor ears. Good and poor kernels.

History: Why is Indian corn so called? Learn of its cultivation and uses by its original growers.

Arithmetic: Develop problems from the reports of club members. Make a survey of the community's corn production. Determine the total yield in the community, the yield on each farm, and the yield per acre.

LESSON FOUR.

Subject: THE APPLE CROP.

Topic: Grading and Packing.

Importance of Grading.—The grading of apples is becoming more important every day. No grower can expect to realize the highest returns from his crop unless it is properly graded. The chief complaint on the part of buyers is improper grading.

Many good apples bring very low prices because they are carelessly or deceitfully packed.

Sorting Tables.—There are various styles (fig. 6) of sorting tables in use. Generally speaking, a table should be 3 feet wide, 6 to 8 feet long, and 6 inches deep. The sides and bottom should be provided with a layer of canvas, burlap, or padding to prevent bruising the fruit.

Sorting.—Apples selected for market should be uniform in size and color, and be free from bruises, disease, and worms. To



FIG. 6. SORTING TABLE—HAND SELECTING.

secure the best results in sorting each apple should be hand selected. This insures against defects. The man doing the sorting should have convenient access to two baskets, one for each of the two grades of apples. This enables him to work rapidly. Faulty fruit should be thrown aside. Extreme care should be exercised not to bruise the fruit in sorting and packing.

Apple Packages.—Barrels and boxes are used for packing apples. The barrel is more generally used as it is less expensive and re-

quires less skill in packing. The box is recommended only when fancy apples of high quality are to be marketed. The extra cost of packing in boxes is justified only when fancy prices are received for the fruit. The producer of large quantities of medium grade fruit having unskilled labor for packing should use the barrel as a package.

Packing Apples.—Remove the bottom of the barrel and stand it on its head. A layer of corrugated paper or a cushion head protector is then placed in position. It adds to the attractive-



FIG. 7. ANOTHER FORM OF SORTING TABLE.

ness of the fruit if a circle of plain or laced white paper is next placed in position. The barrel is then ready for facing. This operation requires some skill and experience to do it well. The facers should be of the same grade as the rest of the apples except that they may be more highly colored. Beginning at the outer edge place the apples in concentric circle with stems down. The standard barrel has a head $17\frac{1}{8}$ inches in diameter. With apples 3 inches in diameter there will be 15 apples in the outer circle,

9 in the next, and 3 in the center. With apples $2\frac{3}{4}$ to $2\frac{7}{8}$ inches the arrangement will be 17 in the outer circle, 11 in the next, and 4 in the center. If the apples are $3\frac{1}{2}$ inches or larger the arrangement will be 13, 7, 1. See that the apples in the first layer (fig. 8) fit snugly. Some packers put in another layer of facers but this is not essential. Over the facers carefully pour a half bushel of apples at a time until the barrel is full. The basket or apron should be let down into the barrel before emptying. After each half bushel is emptied shake the barrel vigorously so that the



FIG. 8. BARREL WITH HEAD REMOVED SHOWING PROPER FACING.

apples will settle firmly into place. When the barrel is quite full arrange the upper layers with the hands so that a level surface may be formed against which the lid may press. The stem ends of the top layer should be turned up. This part of the operation is called (fig. 9) "tailing." The fruit should extend slightly above the staves to allow for shrinkage and to tighten the fruit in the barrel when the head is forced into position. Over this layer place a corrugated cushion or pad (fig. 9), put on the bottom and force (fig. 9) it into the chime. The hoops should then be driven down

and the bottom nailed in. The barrel is now ready for marking or branding.

Box Packing.—A box of the following dimensions is desirable: $10\frac{1}{2}$ inches deep, $11\frac{1}{2}$ inches wide, and 18 inches long. The apples should be wrapped with sheets of tissue paper 9 inches square. The diagonal method of packing is considered best. This consists in arranging the apples in rows of 3 and 2 or 2 and 2 (fig. 10, *b* and *c*) the rows running in the direction of the width. A sheet of heavy paper may be placed between each layer of apples. Heavy paper should be used on the upper and lower



FIG. 9. FROM RIGHT TO LEFT: A BARREL "TAILED;" A BARREL WITH PADDING IN POSITION; FORCING A BOTTOM INTO PLACE.

surfaces as in the barrel pack. Being able to arrange the apples so as to produce the "bulge" in the sides of the box requires a great deal of experience.

Branding.—A brand is a guarantee as to the size and contents of a package. Every producer should put his apples in a standard package and truthfully brand it as to its contents. This can be done at little expense and a much better price can be secured as a result.

A copy of the law concerning the brand should be secured and studied so that the apple producer may not unwittingly make a mistake in branding and thereby lay himself liable to prosecution.

The following is a suggestive brand for a barrel package:

STANDARD GRADE
MINIMUM SIZE $2\frac{1}{2}$ INCHES
WINESAP
GROWN AND PACKED BY
JOHN SMITH
FREDERICK, Md.

Packed under the Act of Congress approved Aug. 3, 1912.



FIG. 10. (b) "SQUARE" BOX PACK; (c) "DIAGONAL" BOX PACK.

Textbook References.—Buffum and Deaver, pp. 167-170; Nolan, pp. 60-63; Davis, pp. 200, 201.

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletins 144 and 178.

Practical Exercises.—(1) Employ the accompanying card and score plates of apples brought to school by pupils. (2) Take the class to a nearby orchard where apples are being packed. Use the accompanying card and score a barrel package. (3) Apple club members should follow the instructions in the foregoing lesson in packing their fruit for market.

SCORE CARD FOR APPLES—PLATE

Variety.....			
	PERFECT SCORE	STUDENT'S SCORE	CORRECTED SCORE
Size (normal): Neither too large nor too small.....	10		
Color, typical.....	25		
Freedom from blemish.....	20		
Texture and flavor.....	20		
Uniformity and trueness to type.....	25		
Total.....	100		
Remarks.....			
Name of pupil.....		Date.....	

SCORE CARD FOR APPLES—BARREL PACK

Variety.....			
	PERFECT SCORE	STUDENT'S SCORE	CORRECTED SCORE
Uniformity of size.....	20		
Uniformity of color.....	20		
Uniformity of shape.....	10		
Condition and freedom from blemishes.....	20		
Attractiveness, including facing and tailing	15		
Barrel, and trimmings.....	5		
Firmness of pack.....	10		
Total.....	100		
Remarks.....			
Name of pupil.....		Date.....	

Correlations.—Language: Have the pupils prepare score cards for use in the practical exercises.

Drawing: Make a sketch of a sorting table; of the “facing” of a barrel pack.

Arithmetic: Have the pupils report the number of barrels of apples packed at their homes. Determine the total production in the community. Find the value of the community production based on market prices. Develop problems on the number of apples of different sizes in a standard barrel.

LESSON FIVE.

Subject: POULTRY.

Topic: Feeding the Flock.

Principles to be Observed.—(1) Such feed stuffs must be employed as give sufficient bulk. Some of the more important of these materials are bran, alfalfa meal, cut clover, green feeds, and oats.

(2) The feed must be rich in protein or nitrogen. This is supplied by such materials as beef scrap, meat meal, bugs, worms, linseed meal, and gluten meal.

(3) Carbohydrates or starches are necessary to furnish heat, energy, and fat. These are supplied by corn, wheat, and other grains. Such materials also contain some protein, but not a sufficient amount.

(4) Fats serve the same purpose as carbohydrates and are more efficient. Fat is supplied by some grains and meat scraps.

(5) Poultry feed must contain a liberal amount of mineral matter. The amount depends upon the age of the fowls and the work that they are doing. Young chickens and laying hens need more than other fowls. Crushed oyster shell and ground bone furnish mineral matter in a desirable form and these should be kept before the fowls at all times unless mineral matter is supplied from other sources.

Rations.—The price of feed is an important factor in selecting the ingredients that enter into the ration. As far as possible home grown materials should be used.

There are many combinations of feeds that produce good results. The following ration is adapted to Maryland conditions and is suggested as one that will give good results under average conditions:

Mash:	lbs.
Bran.....	200
Middlings (wheat).....	100
Corn meal or chops.....	100
Beef scrap.....	100
Salt.....	2½
Scratch Feed:	
Whole corn and wheat, equal parts.	

The mash should be dry fed in troughs or hoppers and can be safely kept before the fowls at all times. The grain should be fed in a litter of straw or leaves morning and night. The fowls are made to work for their grain feed. Fowls prefer grain to dry mash but by regulating the amount of grain fed they may be-made to eat as much mash as grain. Clean water, grit and crushed oyster shells should be kept before the birds at all times.

If the fowls can not get green feed in their runs, it is necessary to furnish them with cabbage, beets, sprouted oats, clover, alfalfa, hay or some other green material that they like. Mangels should not be fed until about Christmas time as they have an injurious effect on the fowls when fed before they have ripened. If fowls get large amounts of insects and worms from the range or are given milk regularly, less meat feed need be fed.

Textbook References.—Davis, pp. 292-294; Maryland Agricultural Experiment Station Bulletin 157, 171.

Teachers' Reading.—Farmers' Bulletins 287, 528.

Practical Exercises.—(1) Require the members of the class to report the poultry rations fed at their homes. (2) Make a trip with the class to a well conducted poultry yard and inspect the methods and materials employed in feeding. (3) Poultry club members should plan their rations to secure the best returns from their laying hens.

Correlations.—Language: The pupils' reports in exercise 1 should be made in writing and copied in the class notebooks.

Arithmetic: Develop problems on the cost of the rations fed to poultry at the homes of the members of the class. To secure the necessary data for these problems it is necessary for the pupils to keep records of the amounts of feed used for a week or some other definite period. Also, determine the number and value of the eggs produced for the same period. Compare the results.

LESSON SIX.

Subject: DAIRYING.

Topic: The Management of Dairy Cows.

Pasturage.—The pastures are becoming short, but dairy animals should be kept on them, especially during open weather.

Beginning with October the feed must be materially increased. This is particularly true with reference to forage.

Rations for Dairy Cows.—When 10 pounds of alfalfa or 12 pounds of clover hay are fed with 35 pounds of corn silage, one of the following grain mixtures should be fed at the rate of 1 pound of grain to $3\frac{1}{2}$ pounds of milk for a cow weighing 1000 pounds:

400 pounds corn chop.	600 pounds corn and cob meal.
200 pounds bran.	200 pounds cotton seed meal.
100 pounds cotton seed meal.	100 pounds gluten feed.
200 pounds corn chop.	300 pounds ground barley.
300 pounds ground oats.	200 pounds gluten feed.
100 pounds cotton seed meal	100 pounds bran.
50 pounds gluten feed.	50 pounds cotton seed meal.

When 8 to 10 pounds of alfalfa, clover, or cowpea hay are fed with about 10 pounds of corn stover, feed 1 pound grain to 3 pounds milk.

600 pounds corn chop.	600 pounds corn and cob meal.
200 pounds dried brewers grain.	500 pounds ground oats.
100 pounds bran.	100 pounds cotton seed meal.
100 pounds cotton seed meal.	
400 pounds corn chop.	600 pounds corn and cob meal.
200 pounds wheat middlings.	400 pounds ground oats.
200 pounds rye distillers grain.	100 pounds bran.
100 pounds gluten feed.	100 pounds cotton seed meal.
50 pounds linseed meal.	

When about 5 pounds clover, alfalfa, or cowpea hay are fed with 20 pounds corn silage and 10 pounds corn stover, feed 1 pound grain to 3 pounds milk.

500 pounds corn chop.	400 pounds corn chop.
200 pounds bran.	200 pounds ground oats.
150 pounds cotton seed meal.	150 pounds cotton seed meal.
200 pounds corn and cob meal.	500 pounds corn and cob meal.
200 pounds ground oats.	150 pounds cotton seed meal.
100 pounds cotton seed meal.	50 pounds linseed meal.
400 pounds corn and cob meal.	300 pounds corn and cob meal.
300 pounds buckwheat midd'ings.	300 pounds ground barley.
	200 pounds cotton seed meal.

When 20 pounds of alfalfa hay are fed, corn and cob meal will furnish the balance of the required nutrients.

When only corn stover is fed, a grain mixture rich in protein is necessary such as the following:

400 pounds gluten feed.
200 pounds rye distillers grain.
100 pounds cotton seed meal.

Rations for Calves.—The young calves that have been taught to eat should gradually be put on a ration. Too much concentrated food should not be given at the beginning but as the winter advances the amount should be increased. The following (rations) are suggested for calves that are eating feed rations:

- | | |
|--|--|
| 1. Bran, 1 pound.
Middlings, 1 pound.
Good hay, all calf will eat. | 3. Shelled corn, 2 pounds.
Bran, 1 pound.
Good hay, all calf will eat. |
| 2. Ground oats, 2 pounds.
Good hay, all calf will eat. | 4. Hominy chop, 2 pounds.
Bran, 1 pound.
Good hay, all calf will eat. |

Housing Calves.—On cold nights or during stormy weather calves should have access to an open shed. If there are only two or three calves on the farm they should be kept in a closed stall during extreme weather.

Care of the Male.—It is important that the male be kept in thrifty condition. He should have access to a pasture for grazing and exercise in open weather. A suitable ration is 3 to 4 pounds of grain, 10 to 15 pounds of silage, and what hay the animal will eat.

Textbook References.—Buffum and Deaver, pp. 237-239; Nolan, pp. 91-97; Burkett, Stevens and Hill, pp. 293-296; Davis, pp. 310-320. (In the last reference omit impertinent paragraphs.)

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletins 104, 169; Farmers' Bulletins 22, 578.

Practical Exercises.—(1) Have the members of the class report in writing the rations fed to the different dairy animals at their homes. These reports should include the kinds and weights of food materials. (2) If possible the teacher should go with the class to a farm where dairying is important. Take notes on the

rations fed and the methods of mixing and feeding. (3) List the feeds grown in the community.

Correlations.—Language: Have the pupils copy in their class notebooks the reports made and the notes taken. Supplement the spelling exercise with the names of feeds.

Geography: Locate the three leading dairy States. Compare them with Maryland as to location, area, population, and agricultural industries.

Arithmetic: Based on local prices determine the cost of the rations suggested in this lesson.

LESSON SEVEN.

Subject: FARM ANIMALS.

Topic: (1) Fattening Meat Hogs; (2) Feeding Horses and Cattle.

Meat Hogs.—During this month the hogs that are to be fattened for butchering should be put on a ration of concentrated food. If the rotation plan suggested in the September lesson is followed the hogs should now be "hogging down" the corn. The advantages of this plan are that the time of the farmer is not consumed in gathering the corn and feeding the hogs. To balance the ration cowpeas or soy beans should be grown with the corn. A few pumpkins grown with the corn add succulent food and keep the animals in a thrifty condition. Provision should be made for supplying the hogs with an abundance of fresh water. Toward the latter part of the feeding period a roller should be run over the ground to knock down any standing stalks. An acre of good average corn should fatten 8 or 10 hogs. The nights are now becoming cold, hence a portable house or a temporary shed should be provided for the hogs. Comfortable quarters are necessary for the best results.

If the foregoing plan is not followed the hogs that are to be prepared for butchering should be placed in a small yard with just sufficient room for light exercise. Succulent food should be used in small quantities and fed daily. If it is permitted to accumulate in the hog yard fermentation sets up and unhealthy conditions develop. Corn is the principal feed for fattening hogs, but it should be supplemented with nitrogenous feed to balance the ration. The following combinations are suggested as rations:

1. Corn 2 parts, wheat middlings 1 part.
2. Corn 2 parts, soy bean meal 1 part.
3. Corn 5 parts, linseed meal 1 part.
4. Corn 9 parts, tankage 1 part.

The daily ration of a hog should be 4 per cent or $\frac{1}{25}$ of the live weight of the animal. Furnish the hogs an abundance of clean water, and clean, comfortable quarters.

Horses.—The work horse should be fed liberally. The amount of food depends upon the size of the horse and the character of the work to be done. Two pounds of feed for each 100 pounds of live weight is usually considered sufficient for animals at steady work. If the work is unusually hard this amount should be slightly increased and if the work is light or irregular it should be slightly diminished. The grain should make up about two-thirds the feed by weight. The stomach of the horse is comparatively small and it is possible to feed too much hay. One pound of forage to 100 pounds of live weight should be the maximum amount. Most of the forage should be fed at the evening meal. Young animals should be fed very much the same ration as work horses, yet in a smaller quantity. Mature animals not at work require less grain and relatively more forage. The following combinations are suggested in making up rations:

1. Oats, 7 pounds; corn, 6 pounds, wheat bran, 2 pounds; timothy hay, 10 pounds.

2. Oats, 7 pounds; corn, 8 pounds; clover, alfalfa or pea vine hay, 10 pounds.

3. Corn, 7 pounds; wheat bran, 6 pounds; and all the corn *stover* that will be consumed without waste.

The grain should be divided into three equal parts and fed at morning, noon and night. Horses should be watered before each meal. Carrots provide an excellent succulent food for horses during the winter months.

Beef Cattle.—During the month of October preparations should be made for protecting beef cattle in stormy and extremely cold weather. The pastures are beginning to fail and the cattle should be started on a spring ration. This should be increased gradually until a full ration is being fed. The ration should be made so far as possible of home grown feeds. A good combination is corn silage, corn and cob meal, and a legume hay such as cowpea, soy bean, clover or alfalfa. If corn stover is used for roughage

it should be cut or shredded so that the part not eaten may be used for bedding. Wheat straw is usually available for bedding, if not, leaves may be used. They can be supplied at \$1.50 to \$2.00 per ton and they contain fertility of greater value.

If legume hay is not available as roughage it is necessary to use a concentrated food containing a large amount of protein. For this purpose cottonseed meal or soy bean meal may be used. About 85 per cent of the cost of cottonseed meal may be saved and added to the soil in the form of manure. Hence, if the manure is well cared for it is almost impossible to lose money by feeding cottonseed meal.

The following are suggestive combinations:

1. Cottonseed meal, 2 parts; corn and cob meal, 1 part; stover or mixed hay.

2. Cottonseed meal, 1 part; corn and cob meal, 2 parts; legume hay.

3. Cottonseed meal, 2 to 5 pounds; silage, 25 to 50 pounds. The first figures are the amounts of the ration at the beginning of the feeding period and the second figures the amounts to be fed by the end of the feeding period.

4. The following is a good ration for baby bees:

Cottonseed meal, 2 to 3 pounds; silage 10 to 15 pounds; legume hay, 5 to 7 pounds.

Textbook References.—Davis, pp. 315–321; Nolan, pp. 91–97; Burkett, Stevens and Hill, pp. 290–292; Buffum and Deaver, 237–240.

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletins 168, 129, 121; Farmers' Bulletins 22, 170, 556, 578, 580, 655.

Practical Exercises.—Each boy in the class should have a baby beef and become responsible for the care and feeding of it during the winter months. If the calf is to be marketed in early spring the fattening process should begin at this time. Weigh the calf to begin with and once each succeeding week. Keep a weekly record of the calf's weight and a daily record of its feed. Those pupils that can not secure a calf should care for some other small animal during the winter months. Secure reports on the rations being fed at the homes of the pupils. Pig club members should begin finishing off their meat hogs. They should follow the directions in this lesson.

Correlations.—Language: Prepare tables for keeping records in connection with the feeding of the calf.

Arithmetic.—Develop problems to determine the cost of given weights of the before mentioned rations; also of the rations being fed at the homes of the pupils. Base calculations on local prices of feed stuffs.

LESSON EIGHT.

Subject: VEGETABLE AND SMALL FRUIT GARDENING

Topics: (1) Planting Small Fruits; (2) Gathering and Storing Vegetables.

Planting Small Fruits.—Kinds: Raspberries, blackberries, currants, gooseberries, and grapes may be grown throughout the State for home use and most of them are or should be important as commercial crops, especially in sections adjacent or accessible to cities. During this month sites should be selected, soil prepared and plants ordered preparatory to planting.

Selecting the Site.—For raspberries good air drainage is necessary, especially in sections where there is likely to be late frost. This is particularly true of Western Maryland. Hillsides or mountain slopes should be utilized. The same general principles as regards sites apply to the other small fruits.

Soil.—Raspberries need a moderately fertile soil, well drained and supplied with an abundance of vegetable matter. Blackberries require a strong clay loam with an abundance of vegetable matter to give the best returns, while dewberries thrive best on a light sandy loam. Currants do best on a moist clay loam with good under drainage. Gooseberries prefer a well drained clay loam well supplied with humus. The grape flourishes on a great variety of well drained soils, but a deep sandy or gravelly soil is preferable.

Planting.—Raspberries are propagated principally by means of tips. The plants may be set in hills 5 or 6 feet apart each way. When grown in rows, the plants should stand 3 feet apart and the rows should be 6 feet apart. For the best results the plantings should be renewed every four years. Blackberries are propagated by root cuttings or by suckers. When planted in hills the plants should stand 7 or 8 feet apart each way; in rows, 8 feet by 3 feet. Dewberries should stand 4 feet apart when staked and 6 by 3 when

trellised. Currants are propagated largely by cuttings. One season's growth furnishes the best source of cuttings. When planted in hills the plants should stand 5 feet each way. In rows the plants should be 4 feet apart and the rows 6 feet wide. Gooseberries may be propagated in the same way as currants. Grapes grow from cuttings or from grafts. Plants should stand 8 feet by 8 feet or in rows 10 feet wide with plants set 8 feet apart.

Varieties.—Black Raspberries: Kansas, Munger, Cumberland and Black Diamond are the most popular. Red Raspberries: Cuthbert, Thompson Early, Loudon, Marlboro and Miller are popular varieties. Blackberries: Early Harvest, Snyder, Mercerau, Eldorado, Blowers, Ward and Rathbun are considered good varieties. Dewberries: Lucretia and Austin are most popular. Gooseberries: Downing and Houghton are the great commercial varieties. Other profitable varieties are: Pearl, Mountain, Joselyn, Triumph, Chatauqua and Keepsake. Grapes: The popular commercial varieties in Maryland are: Moore Early, Concord, Niagara and Delaware. Campbell Early and Moore Diamond are varieties of merit. The Green Mountain should be planted extensively.

Vegetables.—Gathering and Storing: As soon as there are signs of heavy frosts the pepper and egg plants should be pulled up and carried to a sheltered place. The green tomatoes should be picked and spread out in some place out of reach of frost. The large ones will ripen and may be used for soups. The smaller ones should be used for pickle or chow-chow.

Sweet potatoes and turnips should be gathered and stored. If regular houses for root crops are not provided, potatoes and turnips should be banked in earth piles. Provide a slightly elevated place and pile the roots in small heaps. Cover first with a layer of straw or corn stalks and next with earth to a depth of six or eight inches. For additional information as to storing potatoes see Farmers' Bulletins 520, 548.

Textbook References.—Davis, pp. 198, 199, 178, 179; Burkett, Stevens and Hill, p. 100; Nolan, pp. 230–232; Buffum and Deaver, pp. 180–184, 187–188.

Teachers' Reading.—Maryland Experiment Station Bulletins 180, 182; Farmers' Bulletins 213, 255, 471, 520, 548, 643, 647.

Practical Exercises.—(1) Have members of the class bring to school grape canes. Practice them in making proper cuttings.

Set some cuttings in a corner of the school yard to form roots.
(2) Make a survey of the small fruits grown in the community. This survey should include the kinds, the varieties of each kind the success with which each kind or variety has been grown and the purpose of growing in each case, whether for home use only or for market.

Correlations.—Language: Prepare sheets for tabulating the facts obtained from the small fruit survey.

Drawing:—Make sketches of proper grape cuttings.

Arithmetic: Make outlines covering the number of plants for settings given areas of small fruits. Find the cost in each case.

LESSON NINE.

Subject: FLOWER-GARDENING.

Topic: Home and School.

Planting.—Prepare the soil well and plant bulbs. Sow seeds of biennials, perennials and lawn grass. Hardy shrubs may be planted now or even later if the soil can be worked. It is unwise to plant evergreens at this season, as they seldom live when planted in the fall.

Making Soft Wood Cuttings.—If it is desired to grow during the winter such plants as geraniums, salvias, etc., cuttings should be made before heavy frosts have injured the plants. To determine whether the wood of a plant is in condition to make cuttings, take a shoot and bend it abruptly. If it breaks clean the wood is in the right condition. Wood that bends without breaking should not be used.

Winter Care of Dormant Plants.—After the foliage of cannas, dahlias, colodiums, etc., has become blackened, cut it off close to the ground. Take up the roots and allow them to dry partially in a shaded place. Then store them in a dry, cool place where the temperature will not drop below 40°. Gladiolus and kindred bulbs may be stored in sawdust or in paper bags.

Perennial plants may be protected by covering them with leaves, straw, or other litter. This should be done when the plants and the ground are comparatively dry. Tender and half hardy plants such as roses, shrubs and vines should be protected by covering them with a thick layer of straw or by burying them.

Beds and Borders.—Clean up the flower beds and the borders. Pull up and haul away all the old plants. Cover the beds with stable manure and spade the soil deeply. Allow the beds to remain over winter in this state, as the alternate thawing and freezing have a beneficial effect upon the soil. The soil around perennial border plants should be spaded up, manured and raked.

Textbook References.—Buffum and Deaver, pp. 260-263; Nolan, pp. 244-249; Davis, pp. 184-187.

Teachers' Reading.—Farmers' Bulletins 134, 157, 185, 195, 218.

Practical Exercises.—(1) Plant bulbs of tulips, hyacinths, narcissi, lillies and the like. Also, set cuttings and rooted plants of biennials and perennials. (2) Make arrangements to protect the less hardy plants of the school and home grounds. (3) Collect and mount or store mature flower seeds. See Farmers' Bulletin 586. (4) Clean up, spade and manure flower beds and borders.

Correlations.—Language and drawing: Require the members of the class to write a brief description accompanied by a drawing of each kind of bulb planted this month, either at school or at home. List the names of flowers still blooming in the community. Make drawings of some of them.

LESSON TEN.

Subject: MANAGEMENT SUGGESTIONS.

Crops.—Husk and haul in corn. Separate the ears marked for seed and store them. Haul in the stover and put it under cover. When the busy season is over it should be shredded.

Continue sowing wheat. Treat the seed with a solution of blue-stone or formalin. Barley and rye should be seeded this month. The same preparation of the land is necessary as in case of wheat. In the southern portions of Maryland the more hardy varieties of oats such as the Culberson may be seeded in October. In northern and western Maryland the climate is too severe for fall sown oats, hence planting should be deferred until spring.

Haul out the manure and spread on the land. If it is desired to store some for a particular purpose, provide a dry shed.

Farm Animals.—Put meat hogs on a heavy ration and begin getting them ready to slaughter. Brood sows should be well cared for.

Feed the dairy cows liberally so that they will not fall off in their milk when the pastures fail. All young animals such as calves, colts and pigs should be provided with shelter on cold nights and stormy days.

Old and unprofitable hens should be separated from the laying flock and prepared for market. Laying hens should be given careful attention. The season of high-priced eggs is approaching, hence the hens should be made to do their best in egg production.

Horticulture.—Pick, sort and pack apples. Make preparations and plant small fruits for home use. In many parts of the State the soil, climatic and marketing conditions are favorable to the growing of small fruits on a commercial scale.

Begin a campaign to prevent and destroy insects and plant diseases. Remove the earth from around the bases of peach trees, leave the parts exposed for a day, then remove all the borers with a knife and a soft wire probe and replace the earth. Clean up all fallen apples to prevent the spread of insects or disease. After the apple crop is removed plow the land and allow it to lie fallow to kill larvae and pupae of insects that live in ground over winter. Examine hedge rows and underbrush for cocoons. Either destroy these or keep them in a screened box out of doors. In the spring watch for developments.

Plant shrubbery and vines at school and at home. Plan to make the home and the school grounds more attractive.

Gather and store vegetables and root crops.

LESSON ELEVEN.

Subject: NATURE STUDY.

Topics: Plants; Animals.

(Note to teacher: The following outline furnishes material in nature study for the fall months. Interest all the pupils in this work. A few minutes during school hours once or twice a week should be devoted to this work. The pupils should be encouraged to make observations and do considerable work outside of school hours.)

Forest Trees.—Trees are putting on gay colors and dropping nuts. Take advantage of these attractive features to familiarize the pupils with the names of plants. Make a list of trees of the

community and accompany each name with a brief description of the appearance of the plant. Make collections of leaves and nuts. Mount the leaves in a booklet provided for the purpose and store the nuts in a large-mouthed bottle or some other vessel. When wood matures make collections from different forest trees. See Farmers' Bulletins 586 and 468.

Wild Flowers and Weeds.—Make a list of wild flowers that are blooming and the weeds that are ripening seed. Those that can not be named by the teacher or pupils should be sent to the Maryland Agricultural College, College Park, for identification. Mount the flowers in the nature study booklets. Each pupil should be provided with a notebook. Make collections of weed seeds, mount them in bottles and properly label them. See Farmers' Bulletin 586. Study the seeds to determine the manner in which they are disseminated. Are they spread (a) by the wind, (b) by adhering to men or animals, (c) by seed cases popping or exploding, (d) otherwise?

Birds.—Make a list of all birds that may be seen this month. Name those that have spent the summer in the community, those that are transients or on their way south for the winter. Note the summer residents that migrate this month or later. Also, note those that come from farther north to spend the winter. Classify all birds listed according to their manner of catching insects. The four methods are: (1) Climbing over buds, leaves and limbs for insect eggs; (2) searching on the ground for cut-worms, crickets, grasshoppers, etc.; (3) looking among leaves and branches for caterpillars; (4) perching in some open place and darting into the air after flies and beetles.

The following biographical outline should be used in the study of individual birds:

- I. Description.—Size, form, color, markings.
- II. Haunts.—Uplands, lowlands, lakes, rivers, woods, fields.
- III. Movements.—Slow, active, hop, walk, creep, swim.
- IV. Appearance.—Alert, pensive, crest erect, tail drooped.
- V. Disposition.—Social, solitary, wary, suspicious.
- VI. Flight.—Slow, rapid, direct, undulating, soaring, sailing, flopping.
- VII. Song.—Pleasing, unattractive, continuous, short, loud, low. Sing on the ground, on a perch, in the air.
- VIII. Call Notes.—Surprise, alarm, protest, warning.

- IX. Season.—Summer, winter, both. Time of arrival and departure.
- X. Food.—Berries, seeds, insects—how secured.
- XI. Mating.—Habits during courtship.
- XII. Nesting.—Choice of site, material in construction, number and kind of eggs, time for incubation.
- XIII. The Young.—Food, attention, time in nest, notes, actions, flight.

Secure bird pictures from the Audubon Society or from the Perry Picture Company.

Wild Mammals.—Make a list of the wild mammals found in the community. Which are harmful? Which not? Which are used for food? Which not? Group them according to their manner of providing for the winter: (1) Those that store up nothing like the rabbit and the fox; (2) those that collect a supply and store in a hollow tree or in a burrow like the chipmunk (ground-squirrel); (3) those that consume a great deal of food at this time and lay on sufficient fat to enable them to sleep all winter, like the groundhog.

Correlations.—Copy in the notebook the facts learned concerning birds and animals. Make drawings of leaves, flowers and nuts.

Geography.—Compare the homes of the different birds studied as to locations. Are these homes permanent or temporary? Make a similar study of the homes of animals. What things constitute the food supply of birds? How obtained? Apply the same questions to wild mammals. How do birds and wild animals spend their time? How do fowls and domestic animals spend their time? How do people spend the greater portion of their time? Making homes and providing a livelihood?

History. Connect the Baltimore Oriole with the settlement of the State; the naming of the State's principal city.

NOVEMBER.

Introduction.

This is the third of the series of publications in elementary vocational agriculture for the public schools of Maryland. The same plan is followed as in the preceding months. For particular instruction in connection with the use of these lessons the teacher should refer to the introductory statement in the September number.

LESSON ONE.

Subject: SOIL.

Topic: Fall Plowing.

Plowing.—The rush of harvesting should be over and as much time as possible should be devoted to plowing sod land. By plowing sod in the fall or early winter ample time is given for the decaying of vegetable matter and the disintegrating of clods. The advantages of fall plowing are: (1) Injurious insects are destroyed; (2) spring work is lessened; (3) ample time is given for the decaying of vegetable matter, and the breaking up of clods; (4) the rough surface of the edged up furrow checks the flow of water from rains and melting snow, thereby enabling it to be stored for the use of crops in dry weather. Fall plowed land should not be harrowed till spring. If there is considerable growth of vegetable matter or if the sod is very heavy, extreme care should be exercised not to turn the slice completely over, but merely to edge it up. In the event the slice is turned over the vegetable matter forms a blanket which prevents the moisture from passing readily from the subsoil to the soil. On the other hand, if the slices overlap the vegetable matter may be easily cut and mixed with the soil. If the soil contains considerable clay the moldboard should not be so steep as in the case of soil that contains much sand.

The steeper the moldboard the greater the sheering action and this action tends to produce the separate grain structure in the

soil. Heavy soil should not receive such treatment as it is thus made too compact. This condition is desirable, however, in the case of sandy soil. The depth of plowing depends on the practice in previous years and the kind of crop to be grown. It is not considered advisable to increase the depth more than one inch each year. Ultimately soil should be plowed to a depth of not less than 7 inches. Root crops require that the soil be plowed to a greater depth than grain or other crops.

Plows.—Where soils are stony plow shares should have separate cast points so that they may be replaced rather than sharpened. On soils free from stones and gravels and comparatively level, it is advisable to use soft centered, steel plows with the share all in one piece. When the point of the share becomes dull it should be sharpened by an experienced blacksmith.

The Set of the Plow.—To test a plow to ascertain whether or not it is properly set, place a straight edge along the sole so that it touches at the point of the share and at the heel of the landside. In the case of a walking plow there should be a space of $\frac{1}{8}$ inch between the straight edge and the landside at the point just back of where the share and moldboard connect. In the case of riding plows this space should be a half inch. The point of the share should dip toward the land.

Textbook References.—Davis, pp. 70-73; Buffum and Deaver, pp. 40-42.

Teachers' Reading.—Farmers' Bulletin No. 266.

Practical Exercises.—(1) Require written reports of the pupils as to the turn plows used at their homes. (2) Take the class to some good farm or to a hardware store and study a turn plow. Have the pupils learn to name the parts and their uses. Take the parts of the plow apart and set them up. Test the set of the plow set up and observe the dip of the point. (3) Corn club members should be plowing their land in preparation for the ensuing crop.

Correlations.—Language: Require the pupils to write a statement covering the steps taken in setting up a plow.

Drawing: Make sketches of the parts of the plow. Indicate the parts.

History: Have a member of the class prepare a statement covering the use of turn plows in the community. Information as to the kinds of plows used should date as far back as reliable.

Arithmetic: Develop problems showing the economy in using large plows instead of small ones. What amount of land can be turned in a day with a 2-horse plow? With a 4-horse plow? What are the daily wages of one man and two horses? Of one man and four horses? In each case compare the cost of plowing a 20-acre field. A 40-acre field.

LESSON TWO.

Subject: POULTRY.

Topics: (1) The Care of Pullets, (2) Fattening Poultry.

The Condition of Pullets.—Pullets should be ready to lay if they have properly developed. They are rather delicate and need special attention. They should be handled gently and never frightened so that they may produce eggs normally.

Water and Feed.—Good, pure drinking water should always be at hand. Pullets must have a good feed like that suggested in the October lesson. The protein food is most important, as a large percentage of the egg is composed of albumin or protein.

Dry, Sanitary Quarters are necessary otherwise the pullets are subject to colds, roup and other diseases.

Exercise is of fundamental importance. Sufficient exercise is provided if the pullets are permitted to run on an open range. If the runs are small the fowls should be made to work for their feed. Houses should be bright and cheerful inside so that the pullets can remain indoors and be happy and comfortable on bad days.

The Ideal Laying Conditions.—Make the conditions as near spring-like as possible for that is the natural season for laying. Give the birds fresh air, cheerful quarters, pure water and egg-producing feed and the results will be satisfactory.

Selecting Poultry for Fattening.—All poultry stock no longer useful for breeding or egg-producing purposes should be fattened and marketed during the Thanksgiving and Christmas seasons. Hens that are no longer profitable as layers should be prepared for market. It is a fairly easy matter to select a hen that is not laying. The laying hen has a well developed, bright red, healthy looking comb. She is found to be in plump condition, active and working all the time. By examining the body with

the hand it is found that the abdomen is rather full and the two pelvic bones are flexible and well apart so that several fingers may be thrust between them. Hens not conforming to such a test should be culled out and fattened for market.

Rations.—Fattening rations require very little protein. Corn and its products are used largely. The following is a good ration: corn meal, 100 pounds; wheat middlings, 100 pounds; meat meal, 10 pounds, mixed with water and fed. This should be supplemented with a little green feed. Where milk is available the mash can be moistened with it and the meat meal left out. In fattening fowls do not feed too much at any one time. Their appetites may be ruined by one over feeding. Give them what they will clean up at each feeding so that they will be hungry each time.

Methods of Feeding.—The three methods are pen fattening, crate fattening and cramming; but pen fattening is practiced most by farmers and small raisers. The fowls should be placed in small runs to prevent their taking too much exercise and wasting flesh.

Textbook References.—Nolan, pp. 110–111; Doris, pp. 293–294.

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletins Nos. 157 and 171; Farmers' Bulletins Nos. 287, 528, and 656.

Practical Exercises.—(1) Require each member of the class to examine a hen that is known to be laying and one that is known not to be laying and report in writing the results of the examinations. (2) Poultry club members should select fowls for fattening and get them ready for the Thanksgiving market.

Correlations.—Language: Written work is provided in the report called for in the practical exercises. Poultry club members should write letters for quotations on prices of poultry.

Geography: Locate on the map the markets to which the community supply of poultry is shipped. Do the farmers sell to a community market, to a city commission merchant or to a distant retail trade? To what extent is the parcel post employed in shipping poultry?

Arithmetic: Have the pupils secure facts at their homes as to the poultry sold this month. From these facts develop problems adapted to the advancement of the pupils.

LESSON THREE.

Subject: DAIRYING.

Topic: Production of Clean Milk.

Care in Milking.—Milk is a food that is most susceptible of contamination, hence unusual care should be taken to get it to the consumer in a sanitary condition. The barn, first of all, should be free from odors and dust. This means that the barn must be kept clean, and when dust is present, sprinkled before milking time. Avoid feeding hay or silage before or at milking time. The cow should be carefully brushed and the udder washed before milking is begun. The milker should be a healthy person, wear clean clothing and have clean, dry hands. The filthy practice of moistening the hands with milk should be avoided.

Handling the Milk.—As soon as the milk is drawn it should be removed from the barn to the milk house, cooled to a temperature of 50°F. and kept in cold water. Milk may be cooled by running it over a cooler or stirring it in cans sitting in cool water.

Utensils.—The hooded pail is recommended for milking as it aids in keeping out dust. After milking all vessels should be thoroughly washed with a good cleansing powder, scalded or steamed and secured upside down in a place where contamination from dust is not likely.

Textbook References.—Burkett, Stevens and Hill, pp. 296–297; Nolan, pp. 100–103.

Teachers' Reading.—Farmers' Bulletins Nos. 413, 490, and 602; Maryland Agricultural Experiment Station Bulletin No. 181.

Practical Exercises.—(1) If possible the teacher should go with the class to a dairy or to a farm producing dairy products for market and study the method employed in handling milk. Take notes on the care exercised in milking, the manner of handling the milk and the utensils used. (2) If the foregoing exercise is not feasible, have the pupils make written reports as to the practice at their own homes.

Correlations.—Language: Writing up the reports called for in the foregoing exercises provides written work.

Drawing: Sketch milk vessels.

LESSON FOUR.

Subject: HORTICULTURE.

Topics: (1) Gardening, (2) Small Fruits.

Storing of Root Crops.—This work should not be put off later than the first of November. If special cellars or houses are not prepared for storing these crops, temporary kilns may be used. Potatoes, beets, turnips, carrots, parsnips, mangel-wurzels, and salsify may be kept well if placed in conical piles, covered first with straw or corn stalks and then with a layer of earth of sufficient depth to prevent freezing. If the conical piles are of considerable size a small ventilating tube should pass from the ground up through the center of the kiln.

Care of Garden Crops.—Celery should be covered with leaves and litter to insure protection from frost. Cabbage plants grown from seed sown in September should be set on the east side of a ridge of earth thrown up with a plow. The ridge affords protection from cold, northwest winds. Cabbages that are well advanced but green should be pulled up and planted close together. The plants should be protected with a covering of straw or pine brush. Mature cabbage must have the heads covered so that frost cannot get to them. This may be done by bending the heads down and covering them with a layer of earth. Lettuce plants should be set in cold frames.

Small Fruits: Planting.—All small fruits such as currants, gooseberries, grapes, blackberries and raspberries should be set this month. For instructions see the October lesson.

Management Suggestions.—Repair trellises and prune the bearing plants. In the case of very tender plants remove them from the trellis, lay them on the ground and cover them with soil.

Textbook References.—Doris, pp. 157, 178, 179, 198, and 199. Burkett, Stevens and Hill, pp. 204-205.

Teachers' Reading.—Farmers' Bulletins Nos. 255, 295, 433, 548, and 647; Maryland Agricultural Experiment Station Bulletin No. 133.

Practical Exercises.—(1) Secure written reports from members of the class as to the methods of storing vegetables used at their homes. (2) Have the pupils of the class report the kinds and quantities of small fruit set this month.

Correlations.—Language: Work is provided in writing up reports called for in the practical exercises.

Arithmetic: Secure through the members of the class the yields of potatoes, turnips, carrots, parsnips, and mangel-wurzels grown in the community. What is the market price of each of these products? Develop problems on these facts adapted to the needs of the class.

LESSON FIVE.

Subject: CROPS.

Topic: Corn.

Importance.—Corn is Maryland's leading crop. The last census shows the value of the Maryland corn crop in 1909 to have been \$11,015,298; the wheat crop, \$9,876,480; the oat crop, \$584,395; hay and forage, \$6,011,749; Irish potatoes, \$1,782,954; sweet potatoes, \$483,751; tobacco, \$1,457,112. Corn is not only the most important Maryland crop, but it is by far the most important one in the United States. It is a source of food for both man and animals, and has many other uses.

Plant Relatives.—Corn belongs to the grass family. Among its relatives are ordinary grasses, sorghum, sugar-cane, oats, wheat, rye, and barley. It is of interest to know that the word "corn" in Europe means any kind of grain. In the United States the word applies only to Indian corn or maize.

Races of Corn.—Corn is divided into at least six divisions or races. These are (1) dent, (2) flint, (3) sweet, (4) pop, (5) soft, and (6) pod. Dent corn is so called because of a depression or dent in the free end of the kernel. The kernels are usually flattened, more or less wedge-shaped and much longer than wide. This is the most common variety and it constitutes the bulk of the American field crop. Flint corn is very hard and compact. It does not shrink or dent and the kernels are smoother and more rounded than dent corn. The ears are usually much longer in proportion to diameter than dent corn. Sweet corn may be recognized by its wrinkled, horny grain. The ears are small and mature early. The ears of pop-corn are very small and the grains quite round in one type and elongated and pointed at the tip in the type known as rice pop-corn. The grains are very dense. This explains the swelling or popping of the grains when heated.

Soft and pod corn are little known in this section of the country. Soft corn is the kind originally cultivated by the Indians. The pod corn is somewhat of a curiosity. Each kernel is wrapped in a small shuck.

Varieties.—There are many varieties of field or dent corn. The following have been classed by the Maryland Agricultural Experiment Station as important varieties for Maryland conditions: Boone County White, Brandenburg, Cocke's Prolific, Excelsior, Funk's Yellow Dent, Giant Beauty, Hickory King, Hildreth, Iowa Silvermine, Leaming, Munikhuyden, Reid's Yellow Dent, Roslyn Dent, Round Top, Rayston, Skipper, Thomas, U. S. 182, Western Maryland White-cap. Hickory King and Cocke's Prolific are recommended for silage.

The Mixing of Varieties.—The pollen grains borne by the tassel fall on the ends of the silks and through them unite with the ovules borne by the cob. The union of these parts develops into a seed or a kernel. Pollen grains are very light and may be carried a considerable distance by the wind. As the pollen of one variety or race unites readily with the ovules of another the possibility of mixing is unlimited; if different kinds of corn are grown in the same field or on the same farm, mixing does not affect the yield of that particular crop, but seed should not be selected from mixed corn.

Textbook References.—Burkett, Stevens and Hill, pp. 197-202; Buffum and Deaver, pp. 103-108; Davis, pp. 131-132.

Teachers' Reading.—Farmers' Bulletins Nos. 253, 298, 414, 415, 537, 559, and 617; Maryland Agricultural Experiment Station Bulletins Nos. 96, 120, 141, 165, and 190.

Practical Exercises.—(1) Have the pupils of the class bring to school samples of as many races of corn as possible. Compare them. Note the points of similarity and dissimilarity. (2) Have the pupils bring to school samples of as many of the varieties of dent corn as may be found in the community. Carefully study the varieties to be able to recognize them.

Correlations.—Language: Describe an ear of corn of each of the races studied.

Drawing: Make drawings of the ears of corn described and of individual grains of each ear.

LESSON SIX.

Subject: FARM ANIMALS.

Topic: Hog Houses.

Location.—A well-drained site should be selected and if it is sufficiently elevated to give the hogs a climb in reaching it, so much the better. The house should stand on a north and south line so that both sides may receive direct sunlight during a part of the day. If convenient, the house should be so located as to occupy the south side of a hill.

Principles in Construction.—There are four important things to be observed in hog house construction; namely, light, ventila-

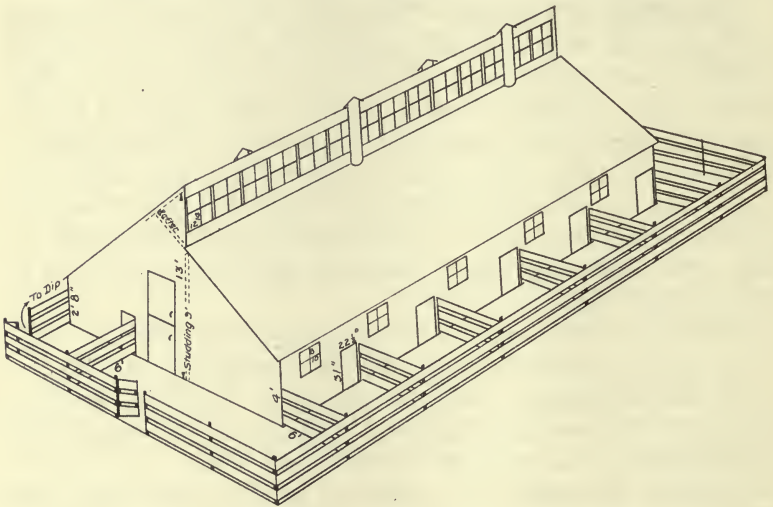


FIG. 1. GENERAL PLAN OF A LARGE HOG HOUSE.

tion, warmth, and cleanliness. Light is provided by placing the house along a north and south line and by putting in suitable doors and windows. Doors, windows and roof ventilation furnish a proper interchange of air. Remember that hogs need good ventilation as well as people. A well constructed house with good floor and bedding provides sufficient warmth. Let it be remembered that the hog has little natural protection from cold, hence the necessity for comfortable quarters. Cement makes

the most satisfactory floor. A good floor makes it much easier to keep the house clean. The arrangement of the house should be such that the beds and feed floors are well separated.

Kinds of Houses.—There are two general classes of houses, large and individual. The large house (fig. 1) has individual pens and is intended for quite a number of hogs. The large house is usually permanent, that is, so constructed that it cannot be moved from place to place. The advantages of the large house are: it is more economical for a large number of hogs; it is more convenient for feeding and it affords provisions for saving

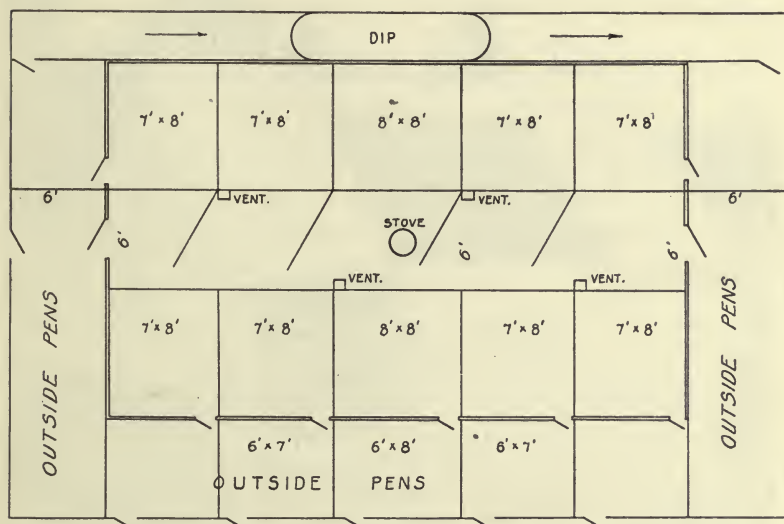


FIG. 2. GROUND PLAN OF HOUSE IN FIGURE 1.

manure. If the house is to be quite large it is generally considered advisable to arrange the pens in two rows (fig. 2) with an alley between. The alley should be 4 to 6 feet wide, unless it is desirable to have space for the passing of a wagon. In that event the alley should be 8 to 10 feet wide.

The individual house (fig. 3) as the name suggests, is intended for one hog or for a sow and her brood. One advantage of the individual or portable house is that it can be moved from place to place and thus made accessible to pastures. There are two general styles of individual houses; namely, the box-shaped with

four upright walls and the A-shaped. The dimensions of the individual house should be 6 feet by 10 feet or 8 feet by 8 feet. Wooden floors are good but not necessary. Whether wood or earth floors are used they should be higher than the outside level of the ground to insure dryness. All houses should be sufficiently high to permit the attendant to move about them with comparative freedom. By placing fenders on the walls of the individual house it may be used as a farrowing pen.



FIG. 3. A GOOD TYPE OF SMALL HOG HOUSE.

Farrowing Pens.—If more than one sow is kept on the farm it may be desirable to have a regular farrowing pen. This pen should be provided with fenders on each wall. The fender may be made of a 2 by 6 scantling and fastened to the wall of the pen some 6 inches above the floor. The object of the fender is to prevent the sow overlying young pigs. As previously suggested,

the individual house may be used for farrowing purposes. The A-shaped house needs no fenders.

Troughs.—There are several kinds of troughs; namely, the V-shaped, made of boards, the hewed-out log, and the flat, shallow board trough. The first mentioned is much used but not very substantial. The log trough is quite substantial and makes a good trough. The flat, shallow trough is adapted to the use of young pigs. Cement and iron troughs are heavy and expensive and not recommended except when they are to occupy a permanent location.

Teachers' Reading.—Farmers' Bulletins Nos. 438 and 566; Maryland Agricultural Experiment Station Bulletins Nos. 150 and 185.

Practical Exercises.—(1) If there is a modern hog house in the community the teacher should take the class to it to study its construction. Take notes on the purpose, the plan, and the accessories. It is well to make sketches of the plan and general arrangement. (2) Require each member of the class to submit a drawing of an individual hog house or farrowing pen. Have each plan accompanied by a bill of lumber for the construction of the house.

Correlations.—Language and Drawing: Material for these are suggested in the practical exercises.

Arithmetic: Find the cost of materials in the bills of lumber submitted by the pupils in exercise 2.

LESSON SEVEN.

Subject: THE APPLE ORCHARD.

Topic: Selecting and Securing Trees.

Importance.—In starting an orchard of any kind it is of vital importance to commence with good trees. The question then naturally arises, what is a good tree?

A Good Nursery Tree.—(1) The tree should be free from insects and disease. San Jose scale, wooly aphid and crown gall are the chief pests to be guarded against.

(2) The tree should be of good size for its age. Frequently two-year old trees that are no larger than one-year old trees are sold for one-year old trees. Such trees are lacking in vigor or have been stunted in their growth.



FIG. 4. ONE-YEAR OLD NURSERY TREES.



FIG. 5. TWO-YEAR OLD NURSERY TREES.

(3) The tree should be well preserved. Sometimes trees are poorly packed or delayed in transit; or if ordered in the spring they may have suffered while in storage during the winter. This is indicated by shriveled twigs and blackened bark on trunk and roots.

(4) If the tree is two years old it should have a well balanced head, formed at the desired height, if it is only one year old it should be a straight whip.

(5) Both one and two-year old trees (figs. 4 and 5) are used for planting out apple orchards. Anything older than two years is undesirable. The one-year old budded tree, from 4 to 5 feet high proves most satisfactory under Maryland conditions. The one-year old tree costs less, can be more easily handled, suffers less in transplanting and can be headed at the desired height. The only argument ever advanced in favor of the two-year old tree is that it comes into bearing earlier. This statement has no foundation in fact.

What the Grower Should Know About a Variety.—The selection of varieties is one of the most important points the orchardist has to pass upon. Many orchards have proved failures because the wrong varieties were planted. The following facts should be known:

1. Age at which the tree comes into bearing.
2. Productive age of tree.
3. Hardiness—ability to withstand climate, insects and disease.
4. Season of ripening. Summer, fall or winter variety.
5. Size of tree—large or small in stature. Spreading or up-right grower like Smokehouse or Yellow Transparent.
6. Color of fruit—red, yellow or green.
7. Keeping qualities of fruit.
8. Shipping qualities of fruit.
9. Quality of fruit—texture, flavor, sweet, sub-acid or acid.
10. Annual or biennial bearer.

This information concerning a variety may be obtained by writing to the authorities at the State Agricultural College and Experiment Station. Before planting out a variety in any locality it is best to make some investigations in the locality itself. If the variety is grown in that locality it can easily be determined whether it is adapted to that section and whether or not it is profitable. If it is not grown find out why. There is generally some good reason for this.

The following rules are given by Waugh for selecting varieties:
For Commercial Orchards:

1. Select a very few varieties.
2. Choose standard market sorts.
3. Give only second thought to quality.
4. Prefer late keeping winter varieties.
5. Choose only hardy, healthy sorts.
6. Plant no oddities or novelties.

For Home Orchards:

1. Select many varieties.
2. Choose family favorites.
3. Put quality first.
4. Provide a succession of varieties.
5. Stick to some good varieties in spite of defects of tree.
6. Test occasional promising varieties and grow some sweet apples, crabs, etc.

In general, the above rules are good advice. Nevertheless, to begin with, the kind of market the commercial orchard sells to should determine the number of varieties to be planted. If the grower is catering to a special or retail market he may be justified in setting out as many as a dozen varieties for then he may want a succession from the earliest to the latest. If, on the other hand, he is growing for the general or wholesale market where he is selling through a commission man or a buyer at the orchard it is more economical and easier to handle and to sell 100 barrels of one variety than ten barrels each of ten varieties. The tendency among experienced growers is towards setting few varieties. The more enthusiastic and the less experienced a grower is the more varieties he is likely to have. If it were not for the problem of interpollination, one variety would be the ideal number for the commercial orchard selling to the general market.

In selecting varieties the orchardist should note the tendencies of the times and look into the future. It is not only to know what the conditions are now but also, and more important, what they are likely to be six or ten years hence, when his trees come into bearing.

How to Deal with Nurserymen.—Having decided upon the varieties the next step in order is the purchase of the stock. Write to several of the nearest nurseries stating varieties and number

of trees of each, age and grade of tree desired. Reserve the right to reject all trees that do not come up to the specifications. It should be definitely stated that diseased, insect-infested or injured trees will not be accepted. The bill of sale and all correspondence relating to the transaction should be filed away for future reference. If a large number of trees are to be bought it is best to visit the nursery and make the selection there.

If a large number of varieties is desired it is likely that one nursery cannot supply them all. Under such circumstances it is better to divide the order rather than accept substitutes. It is always best to get the order in early for late in the season varieties are sold out and only the poorer grades of trees remain. At a nursery he who comes first is not only first served but best served.

Textbook References.—Davis, pp. 188 and 189; Burkett, Stevens and Hill, pp. 83-87; Nolan, pp. 57-60.

Teachers' Reading.—Farmers' Bulletins Nos. 113, 491, and 492; Maryland Agricultural Experiment Station Bulletins Nos. 92, 130, 144, and 178.

Practical Exercises.—(1) The teacher should take the class to a farm where trees are being set. Require the pupils to take notes covering the following points: (a) The age and size of trees, (b) condition of trees, (c) varieties being set. (2) If not convenient to visit an orchard, have the pupils report on the foregoing facts with reference to trees being planted at their homes. Discuss these notes and reports in the light of the foregoing lesson.

Correlations.—Language work is provided in the practical exercises.

Draw a plan of the home orchard showing the locations of the different kinds of fruits.

LESSON EIGHT.

Subject: THE APPLE ORCHARD.

Topics: (1) Selecting the Site, (2) Setting Trees.

Selecting the Orchard Site.—Soil: The apple will thrive on a variety of soils. Practically all the well-drained soils that produce good crops of corn or potatoes will produce good apples. Still it has some preferences and a deep rich sandy or gravelly

loam with a clay subsoil is considered best, and in some cases, even the special requirements of a few individual varieties have been worked out.

Drainage: Apple soils must be well drained in reference to both air and water. For this reason orchards are generally found on slopes or elevations somewhat higher than the surrounding country. Steep slopes, however, are undesirable as upon them the various orchard operations are carried out with difficulty and erosion is likely to be annoying. Pockets or depressions even on high elevations should be avoided for in them the cold air will collect and cause late spring or early fall frosts.

Exposure or slope: Apples are successfully grown on all the four slopes. In a frosty region a northern slope is the safer, but on such a slope there is less sunshine and so the fruit will not have so much color as those growing on a southerly slope. On the other hand, on a southern slope the blossoms come out earlier in the spring and there is more danger of getting caught by late spring frosts.

Preparing the Land.—The more thoroughly the land is prepared in advance of the planting the better it will be for the trees. To begin with, the land should be thoroughly and deeply plowed. A subsoil plow can usually be used to good advantage. The plowing should be followed by the disk or other harrow until the land is thoroughly worked into a fine tilth.

Laying Out the Orchard.—An orchard may be laid out a number of ways. The simplest way is to set stakes all around the field at the distance the trees are to stand apart. If the field is large or hilly it may be necessary to set tall stakes both ways across the middles also. A good plowman with a steady team can then run straight furrows between the stakes. The trees are planted where the furrows cross. By sighting along the rows in both directions aided by a few extra stakes when the trees are being set straight rows can easily be obtained.

Distance Apart to Plant the Trees.—Apple trees are planted from 30 to 40 feet apart depending upon the variety of trees, the nature of the soil and the system of pruning to be followed. The tendency is towards closer planting and more thorough and systematic pruning. If fillers are used the permanent trees should be placed 40 feet apart.

Heeling-in the Trees.—When the trees arrive from the nursery they should be planted or “heeled in.” It is not safe to let them stand in the original package very long. This should be “heeled in” at some point convenient to the orchard site or on the site itself. It consists in digging or plowing a trench in which the trees are placed and inclined preferably towards the south. The bundles should be loosened and the soil worked thoroughly in among the roots. Then cover the roots and part of the trunks and trample well. If the earth is rather dry and the trees are to remain for some time it is best to water them. If the trees should arrive in a shriveled condition from drying out in transit it is best to immerse them in a stream or pond for 24 hours. Under this treatment they often recover completely.

Planting the Trees.—In well prepared mellow soil tree planting is easy. The hole need not be any larger than to actually hold the roots without cramping and permitting the tree to sit a few inches deeper than it stood in the nursery. Before planting cut off all injured roots making a smooth cut and cut all other roots back to 5 or 6 inches in length. This may be done before the trees are distributed for planting. Hold the tree in position and sift some of the finest surface soil over the roots and while so doing joggle the tree gently up and down so that the soil will settle well in among the roots and fill up all air spaces. After the roots are well covered trample the dirt down firmly with the feet; then fill in the rest of the hole, trample down well and throw a few shovelfuls of loose dirt over the surface to serve as a mulch. If the ground has not been thoroughly prepared a hole at least 2 feet in diameter and a foot and a half deep should be dug for each tree. Due precaution should be taken at all times against exposing the roots incessantly to wind and sun. It is a good plan to puddle the roots before distributing them for planting. In the hot spring days it is best to haul the trees in a barrel of water and remove them from the barrel as they are planted.

Pruning the Trees.—Either before or shortly after planting the trees should be pruned. In commercial orchards apple trees are headed at 18 to 74 inches above the ground. If the trees are one year old whips the pruning is a simple matter. All that is necessary is to cut them off at the desired height above the ground. In the case of branched trees (fig 6) select from three to five of the best placed branches to form the frame work of the top. See

that these are evenly distributed around the trunk so as to make the tree as well balanced as possible. Avoid those branches that tend to form sharp angles with the trunk as they are likely



FIG. 6. YOUNG TREE PROPERLY PRUNED AFTER ONE YEAR'S GROWTH.

to split off later when laden with fruit. After removing the branches not desired, shorten back the remaining branches to about 6 inches.

Textbook References.—Davis, pp. 188, 189, 190, 194, and 195; Burkett, Stevens and Hill, pp. 83-86; Nolan, pp. 57-58.

Teachers' Reading.—Farmers' Bulletins Nos. 113, 491, and 492; Maryland Agricultural Experiment Station Bulletins Nos. 92, 130, 144, and 178.

Practical Exercises.—(1) Have the members of the class report on the following facts concerning the home orchards previously set or now being set: (a) The kind of soil, (b) the exposure or slope, (c) the distance between trees. (2) If possible the teacher should go with the class to a good orchard to take notes covering the foregoing points.

Correlations.—Language work is provided in the practical exercises.

Drawing: Sketch a one-year and a two-year tree properly pruned.

Arithmetic: Have pupils secure accurate reports as to the incomes from the home orchards for the year, the number of acres devoted to orchards and the number of trees. From these facts develop problems adapted to the advancement of the pupils.

LESSON NINE.

Subject: BUILDINGS FOR FARM ANIMALS.

Topics: Purposes and Locations of Stables.

Purposes of Stables.—(1) To afford animals protection against the weather; (2) to protect them against injuries from other animals and prevent their inflicting injuries upon other animals and upon persons; (3) to prevent loss by straying; theft, or by over-eating; (4) to make economic feeding possible. It is much easier to feed animals economically and intelligently when confined in proper stalls with suitable mangers than it is to feed in the open. (5) To make possible the production of animals which are gentle, quiet and easily handled; (6) to provide a convenient method of saving and caring for the manures; (7) to allow opportunities for the study of animals in order that they may be managed so as to produce the best results.

Location of Stables.—Stables, pens or houses for farm animals should be so located with reference to the farm dwelling as not to produce unsightly appearances or objectionable odors, and yet

to be convenient as regards distance. Too, they should be convenient to graneries, hay and straw barracks, silos, feed lots, and pastures. Such buildings should have good natural drainage, good light and be so placed as to be protected from cold winds and storms. Care should be exercised to see that the drainage from farm buildings does not flow in the direction of wells or springs providing drinking water for the household. The purposes for which stables are to be used help to determine the proper site for their location.

Practical Exercises.—Have each member of the class prepare a complete description of a stable, pen or house used at home as a shelter for any one class of farm animals. State the purpose of the building and give reasons for its being located where it is.

Correlations.—Language: The description called for in the practical exercises provides written work.

LESSON TEN.

Subject: BUILDINGS FOR FARM ANIMALS.

Topics: (1) Design and Arrangement, (2) Ventilation,
(3) Water Supply and Drainage.

Design and Arrangement.—Before constructing or altering a stable or other building for farm animals a careful study should be made of similar structures in the immediate section for the purpose of ascertaining their good and poor features. While making this study the purposes of the building to be constructed or altered should be kept constantly in mind. It is impossible to lay down a fixed rule to govern the designing of such buildings as each instance presents its own problems. The purpose of the building and the money available determine the design, arrangement and fittings. Simplicity, plain surfaces, rounded corners and fittings of recognized merit should prevail.

Stables should be as free as possible of posts, as they interfere with convenient arrangement of stalls and passage ways. In making a plan the following phases should be observed: Consider carefully the comfort of the animals to be housed and the attendants who care for them. Provide plenty of windows for thoroughly lighting the whole interior. Arrange the stalls and fixtures so

that they may be cleaned conveniently and the necessary routine operations may be carried on with undue labor and expense.

Ventilation.—All public buildings designed to house a large number of people are provided with some method to supply fresh air and to remove foul air. The health of the occupants of these buildings demands that there must be an abundance of fresh air. It is no less important that structures designed to house animals should be equipped with some form of ventilating system in order that animals be abundantly supplied with fresh air at all times. The next important matter to consider is that whatever method is employed in providing animals fresh air and removing foul air, draughts upon the animals should be avoided. In small buildings the proper regulation of windows and doors provides ventilation, but in large stables or dairy barn flues should be provided as outlets and openings in the side walls as inlets. Windows and doors assist in the ventilation of stables, but in large buildings these are not sufficient.

Water Supply and Drainage.—All farm animals thrive better if they have access to pure, fresh water at frequent intervals. Animals which are compelled to drink ice water during the winter months, and stale, warm water during the summer months cannot thrive as those which are supplied with fresh, pure water from springs, wells or streams. Hogs and poultry show quickly the effects of an improper water supply. Water not fit for human use is not fit for animals. Quantity is also essential. The ideal condition is where running water is available at all times in pasture, lot or stall.

Drains in stables and yards immediately surrounding them should be well constructed of non-porous material and should have their outlets at the manure pits or at some point where the drain waste can be used for fertilizing purposes. Neither drainage nor drain pipes should be placed near enough to wells, springs or water supplies to cause contamination of them.

Practical Exercises.—Have each pupil make a ground plan of the building described in the previous lesson. Accompany with a statement with reference to the manner of lighting and ventilating the building.

Correlations.—Language and Drawing: Material for both of these exercises are provided for in the practical exercise.

LESSON ELEVEN.

Subject: MANAGEMENT SUGGESTIONS.

Crops.—Continue husking and hauling corn; haul in fodder and stack it convenient for feeding as long fodder or for shred-dings. The latter is preferable. Although long fodder may be stacked in the open, shredded fodder should be stored. It is not too late to sow rye. Store root crops in cellars or kilns.

Soils.—Continue hauling out manure and spreading it on soil from which it may not be washed away. Clean out old ditches and lay out new ones. If other farm work is not too pressing begin making new ditches where necessary. The weather conditions are too severe in midwinter and other farm work is too pressing in the spring. Keep the plows going, especially on sod land.

Horticulture.—If a new orchard is to be set, select a site and prepare the soil for planting. Select the fruit trees desired and get ready to plant this month. Secure and set out fruit trees that are to take the place of dead or unprofitable trees.

Set out small fruits such as raspberries, blackberries, currants, gooseberries and grapes. Mend trellises and prepare trellises for older plants. Look after celery, cabbage and lettuce plants. See that the first two are properly sheltered and the last are set in cold frames.

Farm Animals.—Give laying pullets careful attention so as to get the best results. Water, feed and kind treatment are necessary. Cull out the unprofitable *hens* and begin the work of fattening. Get them ready for the holiday market. Increase the feed to dairy cows. See that the animals are sheltered at night and on stormy days. All young animals should be provided with shelter on cold, stormy nights. Meat hogs should be fed heavily that they may be gotten ready for butchering early in December. Provide all animals with suitable bedding.

Improvements and Repairs.—Repair fences, roofs of houses, barns, and other out buildings. Store all implements and machinery. Grade the walks and driveways about the farm. Drain all low places and pools and fill in with earth or cinders to provide against sloppy conditions during rainy seasons. During the bright open weather of November is a good time to apply a coat of paint on a building that would otherwise suffer from weather-

ing agencies during the winter. Provide fuel for the winter months.

Flower Gardening.—Continue planting bulbs of all kinds. This can be done safely as long as the ground is not frozen. The same is true with reference to planting peonies. Be sure that the soil is well drained. Set the bulbs so that the eyes will be 3 inches below the surface of the soil. As cold weather approaches mulch the ground with straw or coarse manure. Shade trees and shrubs may be planted now. A top dressing of manure 2 or 3 inches deep may be applied to shrubbery borders.

All tender roses, shrubs and vines should be given protection by wrapping in straw, burlap or similar material. Mulch all perennials with several inches of leaves or coarse manure. To prevent the leaves blowing away a piece of wire netting may be placed on top of them.

Rake up the leaves on the lawn and mix with manure and soil to make a compost.

DECEMBER.

Introduction.

This is the fourth of the series of publications in elementary vocational agriculture for the public schools of Maryland. The plan of the preceding months is followed.

LESSON ONE.

Subject: SOIL.

Topic: Crop Rotation.

Rotation means a change in crops from year to year in regular order. Several different crops are usually included in a rotation system. Beginning with one crop the series is followed through a period of years until the several crops have been grown in order and the first crop in the series has been reached again.

The Purposes of Rotation.—The real purpose of rotation is to maintain or increase the fertility of the soil, at the same time growing profitable crops. There are different kinds of plant food in the soil and if any one of these is used up the soil is unable to feed plants properly. The fact that different crops consume the several elements of plant food in varying proportions makes it possible for the soil to be deprived of most of the available supply of any one element if the same crop is grown year after year. Hence the necessity of changing the crops so that the drain on the different elements of plant food may be more or less equalized.

Other Advantages of Rotation.—In addition to keeping up the fertility of the soil and producing profitable crops, rotation makes possible a number of advantages such as getting rid of weeds, adding vegetable matter to the soil, adding nitrogen and keeping down diseases and insect pests. A cultivated crop keeps down weeds, hay stubble and legumes add vegetable matter and nitrogen, and as each plant has its own diseases and is attacked by particular insects a change each year tends to prevent the growth and spread of these.

Suggestive Rotation Courses.—The crops that enter into a rotation system are determined by such factors as money income, food for man and animals, restoring fertility to the soil, good tillage, and keeping down weeds, insects, and diseases. The following rotations are being practiced with comparative success:

1. WESTERN MARYLAND MOUNTAIN DISTRICT

<i>First year.</i>	<i>Second year.</i>	<i>Third and fourth years.</i>
Corn.	Oats.	Clover and Timothy.

Wheat, buckwheat, rye and potatoes drop into the rotation at irregular intervals.

2. NORTHERN MARYLAND.

<i>(a) First year.</i>	<i>Second year.</i>	<i>Third and fourth years.</i>
Corn.	Wheat.	Clover and Timothy.
<i>(b) First year.</i>	<i>Second and Third years.</i>	<i>Fourth and fifth years.</i>
Corn.	Wheat.	Clover and Timothy.

Spring oats, rye, sweet corn, and potatoes drop into the rotation at irregular intervals.

3. EASTERN SHORE

<i>First year.</i>	<i>Second year.</i>	<i>Third and fourth years.</i>
Tomatoes.	Wheat.	Clover and Timothy.
Crimson clover.		

Strawberries, potatoes, and sweet corn drop into the rotation at irregular intervals.

4. SOUTHERN MARYLAND.

<i>First year.</i>	<i>Second year.</i>	<i>Third and fourth years.</i>
(a) Tobacco.	Wheat.	Clover and timothy.
(b) Corn.	Wheat.	Clover and timothy.

In some instances wheat is substituted by oats. Potatoes and tomatoes drop into the rotation at irregular intervals.

The following rotation is practiced to some extent in Maryland when the soil is run down and in need of humus and nitrogen. It is suggested that the cowpeas or soybeans be cut for hay. The crimson clover should be plowed down; however, it may be cut for hay.

5. GENERAL.

<i>First year.</i>	<i>Second year.</i>	<i>Third year.</i>	<i>Fourth and fifth years.</i>
(a) Corn.	Wheat.	Cowpeas.	Clover and timothy.
	Crimson clover.	or	
		Soybeans.	

Potatoes or tomatoes may be substituted in whole or in part for corn or cowpeas.

Textbook References.—Nolan, pp. 212-214; Davis, pp. 86-95; Burkett, Stevens and Hill, pp. 33-38.

Practical Exercises.—(1) Have each member of the class prepare and submit a statement of the rotation course practiced at home; (2) the teacher should take the class to visit a farm where a good rotation is practiced. Have the pupils take notes on the plan of the farm and the crops included in the rotation course.

Correlations.—Language work is provided in the practical exercises.

Drawing: Require each pupil to make an outline of the home farm showing the location of each crop in the rotation course.

LESSON TWO.

Subject: DAIRYING.

Topic: Making Butter.

Handling Cream.—Cream should be kept at a temperature below 60 degrees Fahrenheit until the time arrives for it to be ripened for churning. Every home should be provided with a thermometer to be used in connection with the handling of milk and cream. When new cream is to be mixed with old cream it should be cooled first to a temperature equal to or below that of the old cream. After adding new cream thoroughly mix the two lots. Five or six hours before churning the cream should be ripened or soured. This is accomplished by raising the temperature to 70°. Ripening or souring is caused by lactic acid germs. In the spring, summer and fall months there is usually a sufficient number of these germs present to produce ripening. During the winter months it is sometimes advisable to use what is termed a "starter." Sour milk of good flavor or curdled skim milk may be used as a starter. Not more than one part of the starter to ten parts of cream is necessary to produce quick results in ripening.

Churning.—When the cream is ready to be churned the temperature should be lowered to 60° in winter and 54° in summer. There are a number of things to indicate that churning is completed. The butter gathers in granules the size of wheat grains or larger; the mass floats above the milk and the sides of the churn are free of butter. The milk has a frothy appearance.

Handling Butter.—As soon as the churning operation has been completed the butter should be salted and worked. Spread

the butter out in a layer two inches thick and sprinkle salt on it. The amount of salt should range from one to one and a half ounces a pound, depending upon the taste and the season. The butter should then be worked until the salt is evenly distributed and the buttermilk is all removed. The next step is packing. The butter should be molded in pound packages and wrapped in parchment paper or placed in jars or tubs. In the latter case the vessel should be covered with parchment paper or cheesecloth and this pasted over with a layer of salt $\frac{1}{2}$ inch thick.

Textbook References.—Davis, pp. 331, 332; Burkett, Stevens and Hill, pp. 297–301.

Teachers' Reading.—Farmers' Bulletins 413, 490, 541, 602; Maryland Experiment Station Bulletin 181.

Practical Exercises.—(1) Require a report of each member of the class covering practice at home with reference to the following points: (a) How cream is handled until it is ready to churn, (b) the kind of churn used, (c) the form in which the butter is put up for use or sale. (2) If possible the teacher should go with the class to a dairy to observe and take notes on the operations connected with churning.

Correlations.—Written work is provided in the practical exercises.

Drawing: Make sketches of churns, thermometers, and butter packages.

Arithmetic: During this month secure weekly reports on the butter made at the homes represented in the school. Develop problems adapted to the advancement of the class based on the reports and the local price of butter.

LESSON THREE.

Subject: HORTICULTURE.

Topic: Gardening and Small Fruits.

Cleaning Up the Garden.—Gather up and burn all old boards, rubbish, tomato stalks, and vines of all kinds. Many injurious insects are destroyed in this way and the rubbish is thus gotten out of the way of young plants in the spring. If manure is plentiful begin now to spread it on the garden.

Making the Compost Heap.—For hotbeds and delicate plants it is necessary to have well rotted manure. This may be had by

preparing a compost heap. For this purpose a mixed barnyard manure is good. The manure should be put in a pile, slightly moistened and turned occasionally to secure thorough mixing, uniform heating, and to prevent burning. The heating process not only thoroughly rots the manure but kills weed seeds and insects.

Mulching Strawberries.—During this month a thick layer of leaves, pine needles, or wheat straw should be spread over the ground occupied by strawberry plants. The advantages of the mulch are that it prevents freezing and thawing and consequent heaving of plants, it helps to hold moisture in the soil during the fruiting season, it keeps down weeds and keeps the berries clean. Even if the winters are not sufficiently severe to cause damage to plants from heaving the good that results in the way of clean fruit justifies the expense of the outlay in providing the mulch. Gritty fruit is a drug on the market.

Textbook References.—Buffum and Deaver, pp. 186, 187; Davis, pp. 196, 197.

Teachers' Reading.—Maryland Agricultural Experiment Stations Bulletin 124, 160, 182; Farmers' Bulletin 192; 198, p. 17; 255, 647.

Practical Exercises.—Members of the various clubs should begin making compost heaps. The tomato club members should have their fathers or brothers to do this work for them.

LESSON FOUR.

Subject: FARM ANIMALS.

Topics: (1) Types and Breeds of Cattle; (2) Beef Cattle.

Types of Cattle.—Most of the improved cattle of today were developed from the native animals of Great Britain and Western Europe. There are three general classes of types; namely, beef breeds, dual-purpose or general purpose breeds, and dairy breeds. Each class has been developed for a specific purpose and the form and qualities are such as to enable the individuals of the class to serve that purpose. Beef breeds (fig. 1) are not raised for milk but for meat. Milk producing qualities are sacrificed for the meat producing qualities which are deepness, plumpness, and compactness of body. These qualities produce a blocky appearance. Dual-purpose breeds, as the name suggests, should serve

two purposes, namely, giving milk and producing meat. However, they do each of these only fairly well. The body is not so blocky and plump as in the case of the beef breeds, neither is it so angular and lean as with the true dairy breeds. Among the more important breeds of this class are the Devon, the Red Polled, and the Polled Durhams, or the Bates family of Shorthorns.

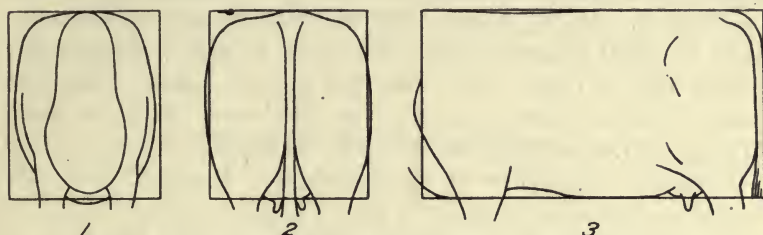


FIG. 1. BEEF TYPE: FRONT, REAR AND SIDE VIEWS.

Dairy breeds (fig. 2) have been developed for the purpose of producing milk. The form is angular and lean, inclined to a wedge shape, when viewed from the side, front or top. The chief breeds of this type or class are Jerseys, Guernseys, Holsteins or Holstein-Friesians, Ayrshires, Dutch Belted, and French Canadian.

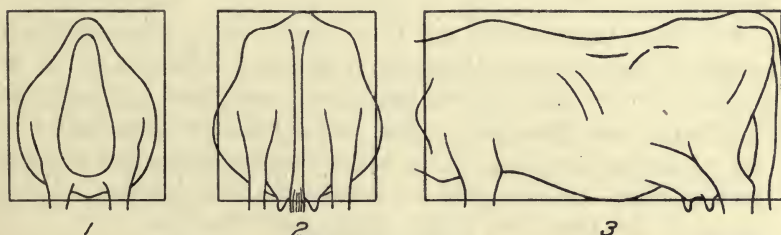


FIG. 2. DAIRY TYPE: FRONT, REAR AND SIDE VIEWS.

Beef Breeds.—The principal beef breeds in the United States are the Shorthorn, the Hereford, the Galloway, and the Aberdeen-Angus. The Shorthorn breed seems to be the most popular in Maryland. It is not considered a good policy to attempt to introduce a new breed where another is well established in a community or section. It is better to improve the established breed and get

the benefit of the reputation that the community or section enjoys as a result of the improvement than it is to attempt to introduce another breed.

Shorthorns originated in England and were first brought to America in 1783. This is the most popular breed in America and is the leading breed in Maryland. It possesses good grazing, maturing, and fattening qualities. The Shorthorn is the largest beef breed. Males weigh 1800 to 2200 pounds and females 1300 to 1600 pounds. The color may be red, red and white, pure white, or roan. The name was given because of the short horns; however, there is a strain of this breed having no horns. (The name Durham has been given to the breed in some localities.)

Herefords originated in Herefordshire, England, and were introduced into this country by Henry Clay in 1817. This is an old, well established breed and ranks next to the Shorthorn in popularity. The animals of this breed are good grazers and respond readily to good feed and careful attention. In size the Hereford is about the same as the Shorthorn. Males weigh from 1800 to 2200 pounds and females from 1200 to 1600 pounds. The color is red with white markings. The white markings consist of a white face, head, neck, shoulder tops and are sometimes on other parts of the body. The red color varies from light to dark. The name is derived from the English shire in which the breed was developed.

Aberdeen Angus cattle get their name from, and originated largely in, the county of Aberdeen, Scotland. While the members of this breed are good rustlers they have never been as popular as Shorthorns and Herefords. This breed matures early and fattens at almost any age. This breed has no horns and is solid black in color. In size they are smaller than Shorthorns. Local names for this breed are Polled Angus and "Doddies."

Galloway cattle are also from Scotland. Like the Angus the Galloway is black and hornless. The marked difference in appearance is due to the Galloway's shaggy or curly hair. These animals can subsist on poor pastures and scanty feed, but they develop too slowly on good feeding. These cattle are hardy because of the climate from which they came, hence are adapted to the northwest. In size they are smaller than the other beef breeds. Males weigh 1700 to 1900 pounds and cows 1000 to 1300 pounds each.

Textbook References.—Buffum and Deaver, pp. 211–214; Burkett, Stevens and Hill, pp. 270–275; Davis, pp. 257–260; Nolan, pp. 81, 82.

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletin 121; Farmers' Bulletin 612.

Practical Exercises.—Make a survey of the beef cattle of the community using the table that follows for tabulating the facts ascertained. The members of the class should prepare tables for their use in collecting facts at their own homes and at their neighbors' homes.

COMMUNITY BEEF CATTLE SURVEY.

Name of owner.....
 Name of pupil.....

BREED	PURE BRED		GRADES		SCRUBS	
	No.	Value	No.	Value	No.	Value
Shorthorn.....						
Hereford.....						
Aberdeen Angus.....						
Galloway.....						

NOTE: "Pure bred" means thorough bred; "grade" means half pure or more; "scrub" means less than half pure.

Correlations.—Language: Prepare tables for taking the beef cattle survey.

History: Study the origin and development of the breeds of beef cattle. See Farmers' Bulletin 612.

Arithmetic: Use the facts obtained in the beef breed survey to develop problems adapted to the advancement of the class.

LESSON FIVE.

Subject: FARM ACCOUNTS.
Topic: Inventory.

Importance.—Every farmer should ascertain at the close of the year just where he stands financially. During the year property has been bought, sold, and exchanged, and it is only by taking an inventory that the farmer is able to determine whether he is worth more or less than he was a year ago. He should know whether

he is conducting a losing or paying business and this can be determined only by comparing each year's possessions with those of the year before.

An Inventory Defined.—It is a statement showing what the land, buildings, equipment, live stock, and produce on hand are worth at the time the inventory is taken. Or, stated differently, it is a list of credits and debits. The statement should be itemized to show what each item of property or indebtedness is worth. After every phase of the inventory has been tabulated and checked on sheets of paper it should be transcribed onto the farmer's permanent ledger.

Taking the Inventory.—At the close of the calendar year is a suitable time for taking the inventory. All matters for the year are being adjusted and plans are being made for the new year. The farmers usually find time for this work around the Christmas holiday season.

Care should be taken that the value of each article of the farm be estimated conservatively. Due allowance should be made for wear and tear of implements and buildings and the depreciation in value of animals as they advance in years. While the farmer should take into account the increase in the value of land and other property, still this should not be permitted to offset losses at other points due to accidents or bad management. After the inventory has been taken it should be compared with previous years to note in what respects there have been failures and in what respects improvements.

Sample Inventory: Farm of.....

PROPERTY	DECEMBER 31, 19....			
	No.	Rate	Valuation	
<i>Real Estate.</i>				
Farm (acres).....	160	\$50.00	\$8,000	
Farm buildings.....	2		2,400	
Barns and fences.....			1,000	
				\$11,400

Sample Inventory: Farm of

PROPERTY	DECEMBER 31, 19....			
	No.	Rate	Valuation	
<i>Live Stock.</i>				
Dairy Cattle:				
Cows.....	20	50.00	1,000	
Bulls.....	1		50	
Calves.....	8	12.00	96	
Heifers.....	4	25.00	100	
Total value of dairy cattle.....				1,246
Hogs:				
Brood sows.....	3	20.00	60	
Large pigs (fat).....	10	18.00	180	
Male.....	1		40	
Total value of hogs.....				280
Horses:				
Horse, 7 years old.....	1		200	
Team, 5 and 6 years old.....	1		450	
Team, 8 and 9 years old.....	1		400	
Colts, 1 and 2 years old.....	2		200	
Total value of horses.....				1,250
Poultry:				
Hens.....	100	.75	75	
Roosters.....	4	1.00	4	
Turkeys.....	6	3.00	18	
Geese.....	15	2.00	30	
Total value of poultry.....				127
Total value of Live Stock.....				2,903
<i>Machinery and Tools.</i>				
Grain binder.....	1		90	
Riding plow.....	1		45	
Disk harrow.....	1		30	
Mower.....	1		35	
Hay rake.....	1		20	
Wagon.....	1		60	
(List other tools).....			400	
Total investment.....				\$680

Sample Inventory: Farm of.....

PROPERTY	DECEMBER 31, 19....		
	No.	Rate	Valuation
<i>Feed and Supplies.</i>			
Corn, bushels.....	600	.60	360
Oats, bushels.....	200	.45	90
Potatoes, bushels.....	50	1.00	50
Hay, timothy, tons.....	10	15.00	150
Hay, mixed, tons.....	5	10.00	50
Silage, tons.....	40	4.00	160
Bran, tons.....	1-2	30.00	15
Seed oats, bushels.....	30	.80	24
Seed potatoes, bushels.....	40	1.25	50
Total value.....			949
<i>Bills Receivable.</i>			
J. F. Smith, hay, tons.....	4	15.00	60
T. A. Brown, oats, bushels.....	50	.50	25
C. J. Jones, corn, bushels.....	60	.60	36
Total.....			121
<i>Cash.</i>			
On hand.....			75
In bank.....			400
Total.....			475
<i>Bills Payable.</i>			
Farm mortgage.....			1,500
Total investment.....			16,528
Bills payable.....			1,500
Net worth.....			15,028

Study carefully the foregoing inventory to note the general form, the parts or divisions, and the items. This inventory is intended to be suggestive. The first division includes real estate and houses; the second, live stock; the third, machinery and tools; the fourth includes feed and supplies; the fifth, bills receivable; the sixth, the amounts of money on hand and in bank; and the

seventh, bills payable. The items on any farm may be grouped under one of these heads.

Teachers' Reading.—Farmers' Bulletin 511.

Practical Exercises.—(1) Require the pupils of the class to prepare blank sheets for taking farm inventories. (2) The pupils should get practice in taking inventories by assisting their fathers with the work this month.

Correlations.—Written work is provided in making sheets for inventories.

Arithmetic: Use the inventories to develop problems in profit and loss.

LESSON SIX.

Subject: POULTRY.

Topic: Diseases.

There are a number of diseases common to poultry during the winter season. It is important that these be given attention at this time.

Roup.—Causes: This disease is caused by germs which are nearly always present. Strong, vigorous birds rarely contract the disease, but it is quite common among those in a weakened condition. Some of the things that produce weakness in poultry and make them subject to roup are improperly ventilated, cold, damp houses, and improper feeding. Birds infested with mites or lice soon become weak and subject to this disease.

Symptoms: Swollen eyes, discharge from the nose, cheesy deposits in various parts of the mouth and sneezing are the leading symptoms. The discharges are usually accompanied by a very characteristic odor.

Treatment: Remove the cause. Get rid of mites if they are present, change the house to make it dry and properly ventilated and give the birds good wholesome food. Every sick bird should be removed from the rest of the flock. If the bird has a very bad case it is probably best to kill it and either burn or bury the carcass. If the bird is not seriously affected it should be placed in dry, comfortable quarters and be given a teaspoon level full of Epsom salts. Bathe the affected parts with a mild antiseptic solution, such as 2 per cent carbolic acid.

Frozen Combs.—This trouble should be prevented by keeping the flock in a well constructed house. If the house opens toward the south, and the roosts are placed in the rear at least 12 feet from the front, there should not be much trouble with combs freezing unless the house is too large for the number in the flock. When a cold snap is expected it is well to grease the combs and wattles with vaseline or lard to prevent freezing.

Treatment: Apply vaseline or lard to frozen parts. When the wattles (gills) become enlarged or swollen indicating the presence of a watery fluid they should be carefully lanced.

Feather Picking and Egg Eating.—Some flocks develop these habits at this season of the year. Hens kept in close quarters are more apt to form these habits than those which have a free range. Improper feeding is usually the cause of both troubles. Although hens may be improperly fed they sometimes continue to lay eggs. In doing this they must use the mineral and protein substances stored up in their bodies. The hens finally get to craving these substances so much that they eat eggs, feathers, or anything available which contains them.

Treatment: Supply proper food. Furnish sufficient lime in the form of crushed oyster shells, and keep before the hens ground bone. To assist in breaking the egg-eating habit place china eggs about the pen to fool the hens, provide dark nests with plenty of nesting material and gather the eggs often.

Teachers' Reading.—Farmers' Bulletins 182, 287, 530.

Practical Exercises.—(1) Poultry club members should look after the health of their flocks. They should see to it that diseased fowls are separated from the flock and treated promptly. (2) If there are sick fowls at the homes of any members of the class, have the symptoms reported. Compare the symptoms with those found in Farmers' Bulletin 530 under the several diseases.

Correlations.—Arithmetic: Secure reports as to the number of mature fowls the community has lost during the year from disease. Find the value of these at the prevailing prices.

LESSON SEVEN.

Subject: POULTRY.

Topic: Marketing.

Marketing Poultry.—Poultry is marketed alive or dressed. Unless one is skilled in the methods of killing, picking, and packing, dressed poultry is likely to reach the consumer in bad condition. As a rule it is better for the Maryland farmers to sell their poultry alive than to try to dress it.

Shipping Live Poultry.—Crates: Considerable attention should be given to the kinds of crates in which the birds are shipped. In the first place, strong, light coops should be used. The lighter the coop the less the cost of shipping. The coops should be sufficiently large to be comfortable to the birds. The standard poultry crate is 2 feet wide and 3 feet long. For ducks, small fowls, and young chickens the height is 12 inches; for geese, old roosters, and large fowls, 16 inches; for turkeys, 20 inches. The coop should have a solid bottom and slatted or spindled sides and tops. Slat should not be more than $1\frac{1}{2}$ inches wide.

Do not crowd the birds in the coop or crate, especially in the summer months. A crate of poultry makes a much better appearance if all the birds in it are the same color and near the same size. These facts should be kept in mind as they might make quite a difference in the selling price.

Killing Poultry.—Birds should be kept without feed several hours before killing. When ready to kill suspend the fowls by the legs and, with a knife, cut the vein at the back of the throat. Then run the point of the knife through the roof of the mouth into the brain. The shock to the brain produces unconsciousness and relaxation of the little muscles controlling the feathers, causing them to come out easily.

Dry Picking.—To be done skillfully dry picking requires much practice. Dry picked birds are preferred in most markets. Immediately after killing while the bird is still bleeding the picker should remove the feathers. Care should be exercised not to tear the skin. As soon as the bird is picked it should be hung up in a cool place until all the animal heat has left the body.

Scalding.—As soon as the bird is through bleeding immerse it three or four times in water slightly below the boiling point. Pick it clean, exercising care not to tear the skin. The fowl

should next be "plumped" by dipping it in nearly boiling water for 8 or 10 seconds and then placing it in cold water for 15 or 20 minutes. Be careful not to over-scald as this causes the skin to rub off.

Packing.—During the winter months dressed birds for retail customers may be packed in small pasteboard boxes and shipped by parcel post. When sold in large numbers they should be packed in barrels using alternate layers of ice and birds.

Teachers' Reading.—Farmers' Bulletin 287.

Practical Exercises.—Secure a report from each member of the class covering the practice at home with reference to the following points: Methods of (a) killing, (b) picking, (c) and shipping dressed poultry.

Correlations.—Language and drawing: Describe and make a sketch of the kinds of crates ordinarily used in shipping live poultry.

Arithmetic: Secure reports on the number of fowls sold by the community for the Christmas market. Find the value based on present prices.

LESSON EIGHT.

Subject: FARM ANIMALS—HOGS.

Topics: Dressing, and curing meat.

Dressing.—Killing: This is done by inserting a knife with a narrow straight blade 8 inches long into the hog's throat just in front of the breastbone. The point of the knife should be directed toward the root of the tail in line with the backbone. When the knife has been inserted 6 or 8 inches it should be given a quick turn and withdrawn.

Scalding and scraping: In scalding the best results are had by using water at a temperature of 185° to 195°. Boiling water placed in a cold barrel is ordinarily reduced to a proper temperature. If the water is too cool much time is required in removing the hair and if it is too hot the hair is likely to set. A shovelful of hard wood ashes, a lump of lime, a handful of soap, a little pine tar or tablespoonful of lye helps to loosen the hair.

The hog should not be scalded before life is extinct or the surface blood will be cooked giving the body a reddish tinge. While being scalded the hog should be kept constantly moving. As soon as the hair and scurf slip easily from the surface scalding is

complete. If the water is too hot scald the hind end first, if too cool scald the front end in order to get a good scald on the head, which is difficult to clean. Clean the head and feet first. The hands and a knife are all that are necessary to remove the hair. After the hair is practically all removed rinse the body with hot water and shave the remaining hairs with a sharp knife. Raise the gambrel cords, insert the stick and hang up the hog.

Removing the entrails: Split the hog between the hind legs, separating the bones by cutting through the joint with a knife. Next run the knife down the middle line of the body, guiding with the right hand and shielding the point with the left hand. Split the breastbone with a knife or an ax and continue the cut on down to the chin. Remove the entrails. Open the jaw and insert a small block to allow free drainage. Wash out all the blood with cold water. The carcass should now be allowed to cool. If the weather is warm split the backbone to hasten cooling.

Cutting: Pork may be cut as soon as thoroughly cool. The head should be removed back of the ears, split the backbone, remove the shoulders between the fourth and fifth ribs and cut off the hams two inches in front of the pelvic bones. Trim the bones to smooth rounded pieces. Remove the fat from all parts, take out the loin, and sparerib. Cut the sides into two or three pieces.

Curing Meat.—The meat should be allowed to cool thoroughly before it is salted. If the weather is cool twenty-four to thirty-six hours is sufficient time to permit the meat to cool before salting.

A clean hardwood barrel is a suitable vessel in which to cure meat. To insure cleanliness scald the barrel thoroughly. Salt, saltpeter, and sugar or molasses are used most commonly as preservatives. Too much saltpeter should not be used as it is harmful to the health. Four to six ounces per one hundred pounds of meat is as much as it is well to use. Salt and saltpeter have a tendency to dry out and harden the meat, hence, by adding a little sugar or molasses the meat is softened and the flavor is improved. For each 100 pounds of meat use 5 pounds of salt, 2 pounds of granulated sugar, and 2 ounces of saltpeter. Mix them thoroughly and rub the meat once every three days with a third of the mixture.

The brine cured meats are considered best for farm use. Brine is less troublesome and at the same time gives better protection against insects and vermin. During warm weather brine should

be watched carefully. If it becomes ropy it should be reboiled or new brine made. Ten pounds of salt, 2 ounces of saltpeter dissolved in four gallons of boiling water should be used to each 100 pounds of meat. Cool the brine before pouring it over the meat.

After the meat has been cured thoroughly by one of the foregoing methods it should be smoked. The meat should be washed thoroughly and permitted to drip before the smoking process begins. The smoke should be provided by a slow fire of some hard wood such as green hickory or maple. In the winter months the smoke should be kept going continuously until the smoking is completed. During the spring and summer a light fire should be kept going a day at a time every two or three days. This intermittent smoking should be kept up for two weeks, then provide a continuous smoke for twenty-four to thirty-six hours and the smoking is completed.

Teachers' Reading.—Farmers' Bulletin 183; Maryland Agricultural Experiment Station Bulletin 185, p. 44.

Practical Exercises.—(1) Require reports from the members of the class as to the methods of curing meat employed at their homes; (2) make a survey of the community's meat production. Secure these facts: (a) The number of hogs butchered at each home, and (b) the dressed weight of each hog. Compile these facts for reference.

Correlations.—Arithmetic: Find the entire amount of meat produced, the value at prevailing prices, the average weight of each hog, and the average amount of meat for each home.

Geography: Does the community produce its own supply of pork? If not, the returns from what money crop are spent for pork? Does the community have a surplus of pork. In what market is it sold? What articles are bought in the same market?

LESSON NINE.

• **Subject:** MANAGEMENT SUGGESTIONS.

Soils.—Continue plowing when soil is in condition. Haul out and spread manure on the land. Note the places on the farm where ditches are necessary. When the ground is not frozen new ditches should be dug and old ditches cleaned out. Plan a rotation of crops for next year.

Farm Animals.—All animals on the farm should now be put on full rations. The weather being cold makes it necessary for animals to have good feed, comfortable quarters, and warm bedding. All products such as butter, milk, and eggs bring good prices at this season so that every attention should be given animals yielding these products to insure securing the best possible results. Give careful attention to sick or injured animals.

Orchard.—Protect trees against "sun scald." On southerly slopes this trouble is very annoying. During the day the sun thaws the bark and then it freezes again at night. Finally the cambium dies. High headed trees suffer more than low headed ones. This trouble may be prevented by shading the trunk with a board or other obstruction to the sun's rays. Trees should be protected against mice and rabbits. Boys aided by dogs and guns may be able to defend the orchards against the attacks of rabbits but mice must be combated by other means. Keep the orchard free of weeds and rubbish, especially around the trees. Mounding up the soil around the trees proves helpful. Keep the snow packed or trampled down under the trees. This prevents the mice working under the snow. The best defense against attacks of mice is some such material as heavy paper or wire netting wrapped around the trunk of the tree. Sometimes they may be kept away by smearing the trunk of the tree with some offensive material like lime-sulphur paste.

The Flower Garden.—As soon as the ground is frozen hard give the lawns a top dressing of well rotted manure. An application of a layer one inch deep is sufficient. Do not use fresh manure as it contains weed seeds nor coarse manure as it makes the lawn appear unsightly. Look after young trees and shrubs when a heavy snow has fallen. Much injury caused by branches breaking under the weight of the snow may be prevented by shaking off the snow. Evergreens like arbor vitae should have their tops tied up to prevent snow lodging between the branches. Look for bag worms. Remove and burn those found hanging on trees and shrubs.

Vegetables and Small Fruits.—Make a compost heap for the hotbed and for the early spring garden. Mulch the strawberries with a thick layer of leaves, pine needles, or wheat straw.

Plans, Improvements, Repairs.—Make an inventory of the farm property. Get ready to start the new year on a sound

business basis. Get in wood supplies. Keep the split-log drag at work. Fix up walks and roads. Look after fences and remove stumps from the fields. Begin to make plans for the next year. Lay out crops, decide as to what tools, stock, and fertilizers may be needed and prepare to get them.

LESSON TEN.

Subject: ROPE.

Topic: Knots.

Rope.—The rope on the farm and in the home is made from either manila, sisal or cotton. The fiber from which the manila rope is made is secured from the leaf and petiole of a kind of palm tree that grows in the Philippine Islands. The sisal is also secured from the leaf of a plant known in the Spanish speaking countries as henequin. The sisal plant is a native of Yucatan. The cotton cord and rope is made from the fibers of the cotton plant.

Care of Rope.—The only kind of oil or preparation that should be used on rope is tallow. On account of the acid that is found in tar, engineers estimate that a tarred rope is only two-thirds as strong as a bright new rope. In removing the rope from a coil, it should be drawn from the middle and uncoiled to the left. This will prevent it from becoming twisted. The stiffness of a new rope may be overcome by coiling the rope in a kettle of water and then heating the water to the boiling point. The rope should then be stretched out and dried. Rope should always be stored in a dry place.

Parts of Rope.—A rope is composed of a number of parts called "strands." Each strand is made up of a bundle of twisted fibers or yarns. Other terms that are used in tying knots are end, standing part, and bight or loop (fig. 3).

Whipping the End.—The end of the rope is whipped to prevent it from raveling. To do this, the two ends of a strong cord are laid side by side on the end of the rope (fig. 4, *a*), and held in place by the left hand. With the right hand the loop is neatly and tightly wound around the end of the rope *b*, until about an inch of the rope is covered. The ends of the cord are then drawn up tightly as in *c* and *d*.

Overhand Knot.—The overhand knot is the simplest and the most used of the knots. It is made by making a loop in the rope and passing an end through the loop (fig. 5).

Square Knot.—The square knot is commonly used in tying up packages and in fastening together the ends of a rope or cord. The easiest and surest way to tie the square knot is to do all the tying with one hand. Begin by tying an overhand knot, and then cross the end held in the right hand over the end held in the



FIG. 3. PARTS OF A ROPE.

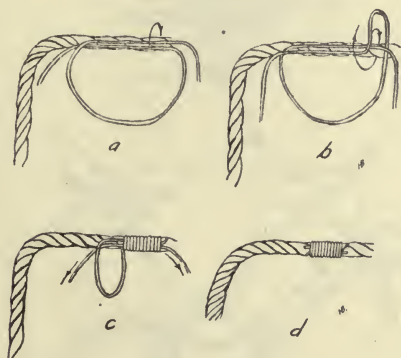


FIG. 4. WHIPPING THE END OF A ROPE.

left (fig. 6, *a*), pass this right hand end around the left hand end and draw the knot tight, *b*. If the ends are passed around in the reverse order it will form a knot that will pull open. This knot is called the *Granny Knot*. In fastening a shoe string, the square knot should be used.

The Weaver's Knot.—The weaver's knot should be used in tying the two ends of a broken strap. It may be used in tying cord or rope if the tie is to be loosed again. To make the weaver's

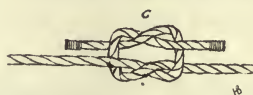
knot place the left hand end over the right hand end (fig. 7, *a*) then pass the standing part of the right hand end around this end, *b*, and finally when drawn tight pull on the main part of the rope, *c*.



FIG. 5. OVERHAND KNOT.



FIG. 6. SQUARE KNOT.



GRANNY KNOT.

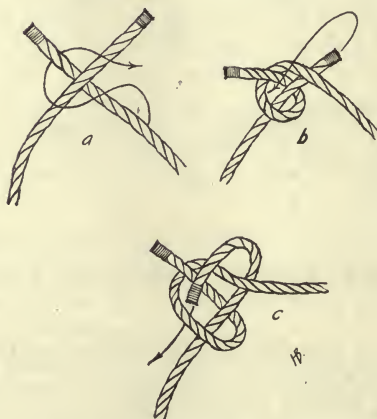


FIG. 7. WEAVER'S KNOT.

Bowline Knot.—The bowline is one of the most useful of the knots. It will not slip and it will not draw tight. It gets its name from the fact that sailors use this knot in mooring ships.

The knot is made by holding the rope in the left hand and forming a bight with the end under the standing part (fig. 8, *a*). The end is then passed down through the loop, *b*, over and around the standing part and back through the loop, and then drawn tight,

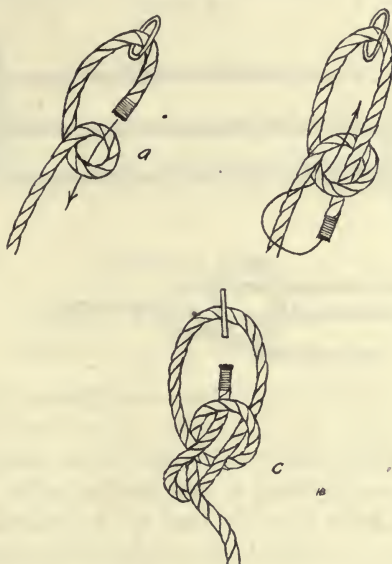


FIG. 8. BOWLINE KNOT.

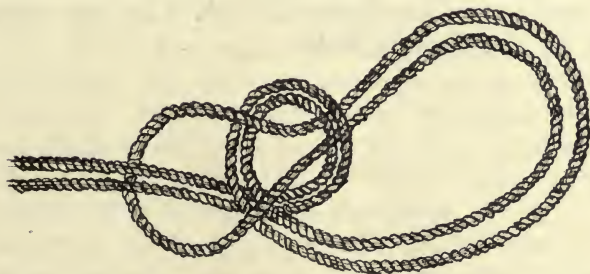


FIG. 9. DOUBLE BOWLINE KNOT.

c. It is easier for the beginner if the rope is passed through a ring or around a stick to hold it in place.

Double Bowline Knot.—The double bowline knot (fig. 9) has all of the advantages of the bowline, but it is used only when it is desirable to hitch to any part of the rope other than the end. To

make the double bowline knot, pick up the rope at the point where the knot is to be made, and tie a loose overhand knot. Now pass the loop end thus formed over the knot and pull through this loop its own part of the overhand knot. To finish the knot pull the rope up tight.

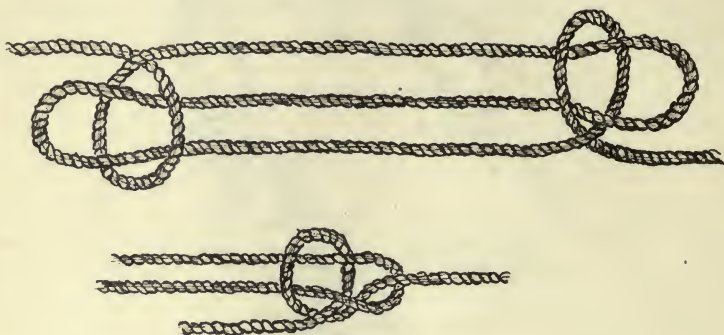


FIG. 10. SHEEPSHANK KNOT.

Sheepshank.—The sheepshank (fig. 10) is used to temporarily shorten a rope, as in using a long hay rope for other purposes. The sheepshank is made by folding the rope back at some point, and then throwing a small bight in the main part of the rope at each end of the fold, and by passing each end of the fold through its bight. If more than one haul is to be made, the sheepshank may be made secure by passing the ends of the rope through the loops on the outside of the bight.

JANUARY.

Introduction.

This is the fifth of the series of publications in elementary vocational agriculture for the public schools of Maryland. The same plan is followed as was employed in the preceding months.

LESSON ONE.

Subject: FARM ACCOUNTS.

Topic: Keeping Books.

Importance.—Farming is a business the same as banking or running a department store. There are products to be grown and sold and articles to be bought. The keeping of a record of these and determining the relation of the outgo to the income are important considerations on every farm. The farmer should know what his financial income is and just how he is disposing of it. He can know this only by keeping books.

What Accounts to Keep.—These range all the way from taking an inventory once each year and comparing it with that of the previous year to the keeping of detailed accounts of all receipts and expenditures. The least any farmer should do is to take a yearly inventory. But he should not be contented with that. Either in a simple or elaborate way he should account for his income and his expenditures. On the ordinary farm a complex system of accounting should not be attempted.

Cash Accounts.—In keeping a cash account the word "cash" is written across the top of the page. All cash received is placed in the cash space in the left-hand side, and all cash paid out in the cash space at the right-hand. At the extreme left of each side the date is placed, and between the date and the cash space the item for which cash has been received or paid out is written. Each column of figures should be totaled at the foot of the page and either the totals or balance carried to the next page. A book

bought especially for the purpose or an ordinary blank note book properly ruled may be used. The following is a sample sheet of a cash account:

CASH

1915		ITEM	REC'D	1915		ITEM	PAYD
Jan.	1	Cash on hand	\$25 00	Jan.	2	Groceries.....	\$4 00
Jan.	10	For meat.....	50 00	Jan.	12	Coal.....	12 00
Jan.	20	For butter....	45 00	Jan.	20	Books.....	4 00
Jan.	30	For eggs.....	5 00	Jan.	25	Rain coat.....	6 00
				Jan.	30	Boots.....	5 00
Feb.	1	Cash on hand	94 00				

At the beginning of each month a balance should be struck and the amount of cash on hand indicated. The same sheet may be used for several months, if convenient.

Individual Accounts.—Such accounts include those kept with laborers, neighbor farmers, certain phases of farm products and the like. A separate page in the account book should be set apart for each individual account. The following is an example of an individual account with a farm laborer:

1915

JAMES JOHNSON

Jan.	1	Employed James Johnson to work eight months from date at \$20.00 per month.			
Jan.	10	To cash.....	\$1 00		
Jan.	15	To check.....	10 00		
Feb.	1	By one month's work.....			\$20 00
Feb.	1	To laundry.....	1 00		
Feb.	15	To check.....	12 00		
Mar.	1	By one month's work.....			20 00
Mar.	1	To laundry.....	1 00		
Mar.	5	To cash.....	5 00		
Mar.	7	To hire of horse and buggy...	1 50		
Mar.	20	To check.....	10 00		
April	1	By month's work.....			20 00

In the same way accounts may be kept with a neighbor, with the poultry flock, with the hogs or any other phase of the farm productions.

Textbook References.—Nolan, pp. 118–122; Davis, pp. 341–345.

Teachers' Reading.—Farmers' Bulletins 511, 572, 593, 635 and 654.

Practical Exercises.—Each pupil of the class should be required to secure an inexpensive blank book, such as a well bound tablet or composition book and properly rule it for keeping records. If the pupils have enterprises of their own they should be encouraged to keep proper accounts in these books. If the pupils are not engaged in projects or club activities they should be required to keep accounts in connection with at least one phase of the farm activities at home.

Correlations.—Written work is provided in the preparation of account books and keeping accounts.

Arithmetic problems should be developed from the accounts given in this lesson and from the pupils' accounts.

LESSON TWO.

Subject: FARM ANIMALS.

Topic: Types and Breeds of Hogs.

Types.—There are two types of swine, namely, the fat or lard type and the bacon type. Both types are found in every locality throughout the State and they are the outcome of local conditions rather than market requirements. The fat or lard type of hog is found where corn is used as the principal feed and the bacon type is found on farms where the hogs receive a variety of feeds.

The Lard Type (fig. 1) of hogs is one which has compact, thick, deep, smooth body and is capable of fattening rapidly and maturing early. The hams, back and shoulders are the most valuable parts and should be developed to the greatest extent. The hind quarters of the fat hog should be comparatively level and the flesh should extend well down to the hocks. The whole body of the animal should be covered with a thick layer of flesh representing the extreme development of meat production. This type of hog, under good conditions, will weigh 200 pounds or more when seven months of age, and this is considered the most popular weight on the market. Because corn is the most available food for our hogs and because the fatter the animals the more pleasing they are to look upon are the reasons more hogs of this type are grown than any other. Until the consumers demand a leaner

quality of pork, the lard type will predominate because they mature earlier and in most cases return a greater profit.

In general appearance the hog is low set, the head is short, the back broad and the body deep. Good quality is shown by the fineness of hair and the neatness of the joints. The front legs should be well apart, an indication of chest capacity which shows a good constitution. From the side the legs should appear straight, standing strong on the toes with erect pasterns. The animal should show extreme smoothness throughout the whole body. Wrinkles are undesirable causing much trouble in dressing



FIG. 1. LARD TYPE: POLAND CHINA BREED.

and giving the dressed hog an unsightly appearance upon reaching the market.

The Most Popular Breeds of the fat type are the Berkshire, Duroc-Jersey, Poland China and Chester White.

The Bacon Type of Hog (fig. 2) is different from the lard type in that these hogs are more active, having longer legs and coarser bones and do not carry as much fat as the former. This leanness is particularly noticeable in the jowl and that portion of the leg just above the hock. The strictly bacon type has a much greater distance from shoulder to ham than the lard hog. The

shoulders and hams are lighter, but the body of the animal is deep and wide enough to give good constitution. The legs of a good constituted animal are set well apart. The most valuable cuts on the bacon hog are the upper parts of the sides and especially for that which is known as breakfast bacon. The most popular market weight for the bacon hog is from 175 to 200 pounds live weight. After reaching maturity, hogs belonging to bacon breeds have been known to become very fat. The sows of this type have larger litters than those of the fat type, and this is one of the

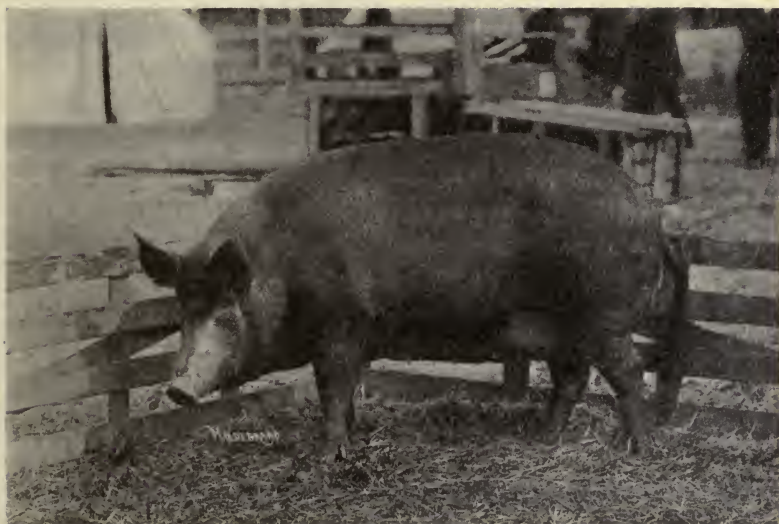


FIG. 2. BACON TYPE: TAMWORTH BREED.

main points argued in their favor by the friends of the bacon hog. It is certainly true, other things being equal, that the sow that is the most prolific is the most profitable.

Breeds.—The Tamworth and Large Yorkshire are the two breeds belonging to the bacon type. The Hampshire is classified with the bacon type in some sections and especially in Maryland.

Textbook References.—Buffum and Deaver, pp. 222–224; Davis, 278–280; Nolan, pp. 86–90; Burkett, Stevens and Hill, pp. 279–282.

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletins 150, 174, and 185; Farmers' Bulletins 205, 379, 438, and 566.

Practical Exercises.—Make a community survey of the hogs. Use the table given below for collecting information. Each pupil should be required to make a sheet or several sheets similar to the one given and fill in the facts as determined at his own and his neighbors' homes. The table here given indicates the kinds of information that should be collected.

COMMUNITY HOG SURVEY.

Name of owner.....

Name of pupil.....Date.....

PURE BRED	NO. OF MALES	NO. OF SOWS	NO. SMALL PIGS	NO. LARGE PIGS	TOTAL
Berkshire.....					
Poland China.....					
Duroc Jersey.....					
Chester White.....					
Tamworth.....					
Yorkshire.....					
Hampshire.....					
GRADES	NO. OF MALES	NO. OF SOWS	NO. SMALL PIGS	NO. LARGE PIGS	TOTAL
Berkshire.....					
Poland China.....					
Duroc Jersey.....					
Chester White.....					
Tamworth.....					
Yorkshire.....					
Hampshire.....					
Scrubs.....					

Correlations.—Language: Prepare tables for making the community hog survey. Preparing tables and practice in tabulating facts are profitable exercises for pupils.

Arithmetic: From the facts obtained in the hog survey develop problems as to the number and value of hogs in the community. Adapt the problems to the advancement of the pupils.

LESSON THREE.

Subject: THE ORCHARD.

Topic: A Study of Fruit Buds.

Importance.—In order to prune a tree intelligently it is necessary to understand its fruiting habits. Buds may contain only rudimentary leaves or rudimentary flowers with or without leaves. The former are called leaf buds and the latter, flower or fruit buds. Fruit buds are often readily distinguishable from leaf buds by their location and appearance. This enables the fruit grower to anticipate his crop and it also serves as a guide in pruning the various fruits.

Recognizing Buds.—In the peach and apricot and many varieties of plums a flower bud is normally on each side of the leaf bud on the young shoots of bearing trees. In the apple and pear, the fruit buds are less definitely located but are mostly formed on short, thick, gnarly little twigs called fruit spurs. These spurs are mostly found on wood that is three or more years old. In the apple, cherry, and peach the flower buds are plumper and more rounded than the leaf buds. In the grape, flowers appear at the first two or more nodes of the young shoots that grow from the canes formed during the previous season, and the shoots continue to grow beyond the flowers. The raspberry, dewberry, and blackberry bloom like the grape except that the flowers are formed at the end of the shoots.

Textbook References.—Burkett, Stevens and Hill, pp. 51-59; Nolan, pp. 229-234; Davis, pp. 35-41.

Teachers' Reading.—Farmers' Bulletins 157, 181, and 471.

Practical Exercises.—The pupils should be asked to bring in fruiting branches of the various fruits. If placed in water and properly cared for they will develop nicely and come into bloom. The following procedure is suggested.

The Apple:

1. Note the rings or scars on the branches. These rings mark each year's growth. Trace age of different twigs.
2. Study fruit spurs as to (a) position, (b) growth including age, number of buds and scars. What do they indicate?
3. Distinguish fruit buds from leaf buds. Fruit buds are plump and rounded. Cut open each and examine contents with a hand lens. Study as many of the other fruit buds as you have time

for, compare them with one another, determine wherein they differ and in what respects they are alike.

Correlations.—Language and Drawing: Describe and make drawings of fruit branches showing the location of buds.

LESSON FOUR.

Subject: POULTRY.

Topics: (1) Types and Breeds.

(2) Mating.

There are about 120 varieties of chickens described in the present American Standard of Perfection. With such a large number a method of classification is necessary to be able to select a suitable breed for one's use. The most popular and practical classifica-



FIG. 3. EGG BREED: BROWN LEGHORN.

tion of poultry is according to use. The four classes or types include the egg breeds (fig. 3), the meat breeds (fig. 4), the general purpose breeds (fig. 5), and the fancy or ornamental breeds.

Egg Breeds.—The most popular egg variety at the present time is the Single Comb White Leghorn. They are rather small, sprightly, active, nervous birds and can fly high. They rarely

become broody and when they do they are not very successful hatchers, therefore they are known as non-setters. They lay a good marketable sized egg with a uniform white color. They lay well in the winter time when properly cared for but cannot stand neglect at this time so well as some of the other more heavily feathered breeds. They can hardly be classed as a variety for general farm use but where one desires to produce eggs in large quantities they are as good as can be found. Among the other egg breeds should be mentioned other varieties of Leghorns, Minorcas, Spanish, Hamburgs, Andalusians, and Red Caps.



FIG. 4. GENERAL PURPOSE BREED: ORPINGTON.

Meat Breeds.—The large meat breeds are not so popular as they were a few years ago. The Light Brahma, the largest breed of fowls has a standard weight of $9\frac{1}{2}$ pounds for the hen, and 12 pounds for the cock bird. Other meat breeds are the Cochins and Dorkings.

The General Purpose Breeds are very popular as a farmers' and villagers' type. Most of these breeds lay very well and in addition produce a meat carcass that suits a majority of the consumers. The average family cannot use either the extremely large or small breeds economically. The Barred Plymouth Rock

has been the old farm standby for many years and it is still very popular although some of the newer breeds are creeping in. One of the advantages of this variety is that many consumers have come to think that Barred Feathers and good meat always go together. This helps the sale of this variety. About the only objection to Barred Plymouth Rocks that can be raised is its black pin feathers which do not help the looks of the dressed product.

There are many varieties to choose from when selecting a general purpose fowl. There are six varieties of Plymouth Rocks, eight

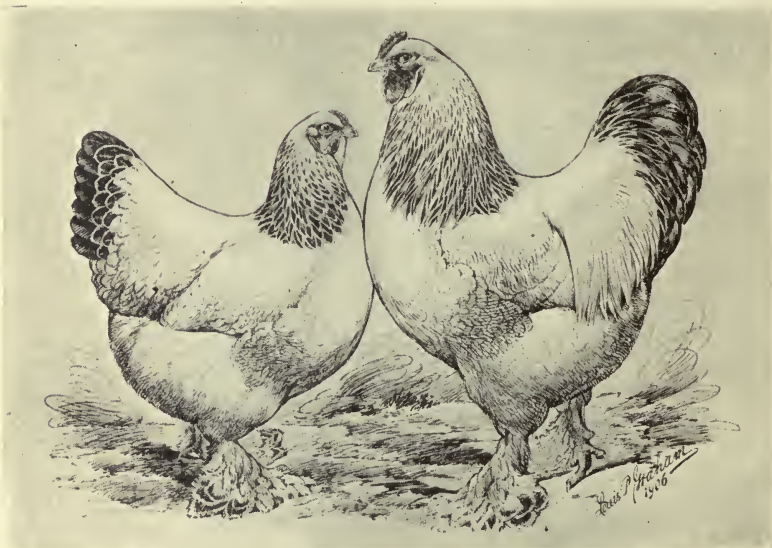


FIG. 5. MEAT BREED: WHITE BRAHMA.

varieties of Wyandottes, two varieties of Rhode Island Reds four varieties of Orpingtons, two varieties of Sussex, and several other rather popular varieties often used for general purpose poultry. All these general purpose varieties are good sitters and mothers, which is quite an item with the man who keeps only a few chickens and does not hatch with an incubator.

Ornamental Breeds.—By going into a large poultry show you will find birds of many freak colors and shapes. You will find birds with naked necks or with huge crests or top knots; birds with

long legs and necks and with their combs cut off; birds with legs so short you can hardly see them; birds with curly feathers, some with no real feathers but covered with down; some so small they need special cages, and most anything else it is possible to breed. These are what are usually termed ornamental breeds.

Mating.—Some time during January or February is the proper time to mate breeding stock. The first and most important thing to consider in this connection is the health, vigor, and vitality of the stock. You cannot get strong, vigorous stock unless you select strong, vigorous birds for the breeding pen. One should have no trouble in picking out the strong, healthy birds. Use only those that have good deep bodies, bright combs, healthy plumage and evidences of health apparent all over them.

The Number of Hens that can be allowed with one male varies greatly. Where a cockerel is used, the birds have free range of a farm, a medium sized breed is kept and the birds are in a good healthy condition, from 12 to 15 hens can be safely kept with one male. A smaller number is desirable when cock birds are used or when the flock is kept confined in small yards. More hens can be allowed to a male in the case of the Leghorn breeds, as many as 20 or 25 being used under favorable conditions. With very large breeds the number of hens to each male should be less.

Eggs May Be Saved for hatching after the flock has been mated a week or ten days. Eggs laid 10 days or even two weeks after the male has been removed will frequently hatch.

When two or more males are kept in one pen they often fight. This may prove harmful to the fertility of the eggs. In this case it is good policy to let only one male out at a time, keeping the other or others penned up. When only two are used they can be let out on alternate days.

Textbook References.—Buffum and Deaver, pp. 225-228; Nolan, 110-114; Burkett, Stevens and Hill, pp. 282-286; Davis, pp. 283-287.

Teachers' Reading.—Farmers' Bulletins 287, 528, and 562; Maryland Agricultural Experiment Station Bulletins 157 and 171.

Practical Exercises.—A community poultry survey should be made this month. Have the members of the class prepare sheets similar to the suggestion found following and collect the information indicated. Each member of the class should collect data at his home and at the homes of his neighbors. After the sheets

have been brought in all the figures should be compiled for reference.

COMMUNITY POULTRY SURVEY.

Name of owner.....

Name of pupil.....Date.....

TYPE	BREED	NO. OF MALES	NO. OF HENS	NO. OF PUL- LETS	NO. FOR MEAT	TOTAL
Egg.....						
.....						
.....						
.....						
.....						
Meat.....						
.....						
.....						
General Purpose.....						
.....						
.....						
.....						
.....						
Fancy.....						
.....						
.....						
.....						
Grand Total.....						

Correlations.—Language: Preparing sheets and tabulating the poultry survey records provide profitable written work.

Arithmetic: From the facts tabulated in connection with the poultry survey develop problems as to the value of the poultry in the community, the number in each breed, the fractional part and the per cent that the number in each breed is to the whole number. Adapt the problems to the advancement of the pupils.

LESSON FIVE.

Subject: DAIRYING.

Topic. Testing Milk.

Importance.—The principal advantage of the milk tester on the farm is that it enables the farmer to detect the cows that are profitable and unprofitable and hence to improve the herd. The producer of milk is able also to determine the quantity and value of the milk.

Equipment.—The following parts are necessary for making the test: (a) Babcock tester, (b) milk bottle with graduated neck, (c) pipette or milk measure, (d) acid measure.

Making a Babcock Test.—The steps are the following:

(1) Secure a fairly fresh sample of milk and thoroughly mix it.

(2) Immediately insert the pipette or milk measure and suck until the milk has gone above the mark on the pipette, then quickly place the forefinger over the top and allow the milk to run down to the mark by slightly relieving the pressure of the finger. The pipette now contains 17.6 cubic centimeters of milk.

(3) Empty the milk in the bottle by permitting it to flow down the side of the neck of the bottle.

(4) The acid measure contains, when filled to the proper mark, 17.5 cubic centimeters of acid. The measure should be filled with sulphuric acid with a specific gravity of 1.82 to 1.83. The acid should be emptied into the milk bottle in the same way as in the case of the milk. Permit it to run slowly down the side of the neck of the bottle.

(5) Mix the acid with the milk by giving the bottle a rotary or turning motion.

(6) Allow the mixture to stand a few minutes.

(7) Again mix the milk and acid by shaking and place the bottle in the tester.

(8) Run tester five minutes at the rate of speed recommended.

(9) Now add moderately hot water (above 180° F.) until the contents come to the neck of the bottle.

(10) Whirl three minutes in the tester.

(11) Add moderately hot water (above 180° F.) until the contents of the bottle reach about the 8 per cent mark.

(12) Whirl one more minute and read the test. The difference between the top and bottom of the fat column gives the per cent of fat.

(13) Points to observe in making the test: (a) Be sure to have a fair sample of milk; (b) the temperature of the milk should be from 60 to 70°; (c) the tester should run at the right speed and should not jar; (d) read the test twice to insure correct reading.

Textbook References.—Burkett, Stevens and Hill, pp. 304–308; Nolan, pp. 107–110.

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletins 169 and 187.

Practical Exercises.—(1) If practicable have the school secure a five dollar Babcock tester. Require the pupils to bring to school specimens of milk and give them practice in testing milk. When they have learned to make the test accurately they should select carefully specimens of milk and make the tests to determine the value of the cows at home as butterfat producers. (2) The members of the class having Babcock testers at their homes should be required to make reports on the tests made.

Correlations.—Language: Writing up reports of the milk tests made at school and at the homes of the members of the class provides suitable language work.

Drawing: Have the pupils make sketches of the parts of the equipment used in testing milk.

Arithmetic: (1) How many pounds of butterfat in 2500 pounds of milk testing $4\frac{1}{2}$ per cent?

(2) A farmer has a herd of 20 cows that average 22 pounds of milk each daily. How many pounds of milk does he get in 30 days? If the milk tests 4 per cent butter fat, how many pounds are produced each day? In 30 days? At 25 cents a pound what is the value of each day's production? What is the value of 30 days' production? Have pupils gather data at their homes and develop similar problems.

LESSON SIX.

Subject: DAIRYING.

Topic: Breeds.

Dairy Breeds.—The dairy breeds of cattle common in the United States are Holstein, Ayrshire, Jersey, Guernsey, Dutch Belted and Brown Swiss. Among the breeds commonly found in Maryland are Holstein, Ayrshire, Guernsey and Jersey.

The Dairy Type.—The individual of a highly developed dairy breed is characterized by the following points:

(1) Extreme angular form, no surplus flesh but indications of vigorous physical condition.

(2) Extraordinary development of the udder and milk veins.

(3) Large, well developed barrel as compared with the size of the animal.

The Holstein.—This breed (fig. 6) originated in Holland. It is one of the oldest in existence and the largest of the dairy breeds. The average weight of the mature cow is 1200 pounds, and males



FIG. 6. HOLSTEIN BREED.

weigh from 1800 to 2200 pounds. The color markings are variegated white and black. Usually about equal parts of white and black are preferred.

As a breed the Holsteins have the best disposition or temperament of any dairy breed. While cows of this breed have an abundance of nervous energy they are not excitable or easily disturbed. Holsteins produce more milk than any other breed, but the per cent of fat averages the lowest. This breed is better adapted to the production of milk for the market and for cheese

making than for butter making. The cows are heavy feeders and require level, rich pastures. The breeding qualities are excellent.

The Ayrshires.—The native home of this breed (fig. 7) is the county or shire of Ayr in southwest Scotland. The average cow weighs 1000 pounds and the males range in weight from 1400 to 2000 pounds. The common color is spotted red or brown and white in varying proportions.

The animals of this breed are more active and alert than the Holsteins, but they are not easily excited or disturbed. They



FIG. 7. AYRSHIRE BREED.

are good breeders. The milk is richer in fat than that of the Holsteins, but the quantity produced is not so great. This breed is well adapted to market milk production.

The Jersey.—This breed (fig. 8) takes its name from the island on which it was developed in the English Channel. This is the smallest of the dairy breeds, excepting the Kerry. The average cow of this breed weighs between 800 pounds and 900 pounds. The males range from 1200 to 1700. The Jersey cow is looked

upon as being the model of what is considered the dairy form. She has the pronounced wedge shape, large barrel, well developed udder, and no excessive flesh while in full milk flow. The most common color is fawn with black markings. The color may vary from almost white to dark gray or black.

The cows are of a highly nervous temperament. They are gentle when carefully handled, but the reverse when abused. The quantity of milk is less than almost any dairy breed, but it is



FIG. 8. JERSEY BREED.

considered the richest in fat. This breed is well adapted to butter production. The cows are good breeders and bear calves at a very early age.

The Guernsey.—This breed (fig. 9) originated on the island of the same name in the English Channel. The Guernsey cow weighs about 1000 pounds. This breed is coarser boned and more irregular in form than the Jersey. The colors range from an

orange yellow to an orange fawn with white markings on the face, flanks, legs and switch. The temperament of the Guernsey cow is quite good. Although she possesses an abundance of nervous energy she is not excitable or irritable. The conformation of the Guernsey is of the dairy type. The breeding qualities are fair, but the cows do not come to maturity as early as do the Jerseys.

The milk and butter have the yellowest color of any breed. Like the Jerseys the Guernseys are not adapted to the production



FIG. 9. GUERNSEY BREED.

of market milk. Their special adaptation is in the production of cream or butter.

Textbook References.—Buffum and Deaver, pp. 211–215; Nolan, pp. 78–80; Burkett, Stevens and Hill, pp. 273–275; Davis, pp. 263–269.

Teachers' Reading.—Farmers' Bulletin 106.

Practical Exercises.—Make a survey of the dairy cattle of the community. Have the members of the class prepare sheets sim-

ilar to the one following and collect the data indicated thereon. Compile the data and preserve it for reference.

COMMUNITY DAIRY CATTLE SURVEY.

Name of owner.....

Name of pupil.....Date.....

PURE BRED	NO. OF MALES	NO. OF COWS	NO. OF HEIFERS	NO. OF CALVES	TOTAL
Holstein.....					
Ayrshire.....					
Jersey.....					
Guernsey.....					
Brown Swiss.....					
.....					
Grade.....					
.....					
.....					
.....					
.....					
.....					
Scrubs.....					
.....					
Grand Total.....					

Correlations.—Language: Make sheets for the dairy cattle survey and tabulate the data collected.

Arithmetic: Develop problems as to the number and value of dairy cattle in the community. Compare the values of pure bred and grade animals. Adapt the problems to the advancement of the pupils.

LESSON SEVEN.

Subject: HORTICULTURE.

Topic: Planning the Garden.

Location.—The garden should be located as near the house as possible to make it convenient both for working it and for gathering vegetables. The work in a garden is usually done at spare times, and for this reason alone it should be near the dwelling. It is an easy matter to change the location of the garden and sometimes it is advisable every five or six years.

The lay of the land has much to do with the time that the soil may be worked. A gentle slope toward the south or southeast is desirable for the production of early crops. Good drainage is essential as water should not stand on the land. The garden should not be subject to overflow.

A good fence around the garden is almost indispensable. It should protect the crops against animals of all kinds, including poultry and rabbits.

Plan and Arrangement.—It is impossible to suggest a plan suited to all conditions, but where possible, the garden should have much greater length than breadth. This makes it possible to use machinery and horses in the cultivation. The accompanying plan and arrangement should prove suggestive (see plan on page 121):

Textbook References.—Davis, pp. 173–174; Nolan, pp. 238–241; Buffum and Deaver, pp. 154–156.

Teachers' Reading.—Farmers' Bulletins 218, 255, and 647.

Practical Exercises.—Have each member of the class to draw to scale the home garden. Compare the several drawings in the class and discuss the advantages and disadvantages in each case.

Correlations.—Drawing: This work is provided for in the practical exercise.

Arithmetic: Find the area of the garden at the home of each member of the class. Find the number of square feet, square yards, square rods, and the fraction of an acre in each garden.

Find the cost of the material inclosing each garden spot.

LESSON EIGHT.

Subject: FARM ANIMALS.

Topics: { (1) Standards for Studying
Horses and Dairy Cattle
(2) Lice.

Types of Horses.—There are two types of horses in general use. The draft horses such as the Percherons, Belgians, and Clydesdales, do the heavy hauling in our cities and draw the heavy loaded wagons and other implements on the farm. Draft horses should not weigh less than 1500 pounds. Although we frequently see much smaller horses pulling the heavy binder or roller on the farm, this kind of labor could be done much more economically if heavier horses were used. The draft horse should be large and

Hotbed	Cold Frame	Seed Bed	1	Rhubarb	Horseradish	French or Burr Artichokes	Herbs
Gate or entrance			2				
3	Parsnips		Asparagus				
4			Carrots				
5	Beets		Salsify and similar long-season crops.				
6	Lettuce (followed by celery)		Peppers	Eggplant			
7			Radishes (followed by celery)	Onion sets (followed by celery)			
8			Early beans (followed by celery)				
9			Early peas (followed by celery)				
10			Later plantings of peas and beans (followed by spinach and multiplier or potato onions)				
11			Later plantings of peas and beans (followed by spinach and multiplier or potato onions)				
12			Later plantings of peas and beans (followed by spinach and multiplier or potato onions)				
13			Early cabbage (followed by late peas and beans)				
14			Early cabbage (followed by late peas and beans)				
15			Tomatoes (plants 4 feet apart in row)				
16			Tomatoes (plants 4 feet apart in row)				
17			Okra, New Zealand and spinach, and miscellaneous vegetables.				
18	Cucumbers		Melons		Squashes		
19			Early potatoes (followed by late corn or cabbage, planted between potatoes before digging)				
20			Early potatoes (followed by late corn or cabbage, planted between potatoes before digging)				
21			Early potatoes (followed by late corn or cabbage, planted between potatoes before digging)				
22			Early potatoes (followed by late corn or cabbage, planted between potatoes before digging)				
23			Early corn (followed by turnips or rutabagas)				
24			Early corn (followed by turnips or rutabagas)				
25			Early corn (followed by turnips or rutabagas)				
26			Early corn (followed by turnips or rutabagas)				
27			Sweet potatoes, Jerusalem artichokes, or pumpkins				
28			Sweet potatoes, Jerusalem artichokes, or pumpkins				
29			Lima and other pole beans				

¹Plan of a half-acre garden. Length, 220 feet; width, 100 feet. Adapted from Farmers' Bulletin 255.

massive, powerful in form and appearance, and possessing big, heavy bones.

The horses which are used to convey rapidly along the road light driving vehicles are known as light harness horses. This type of horse is useful on the farm in making quick trips to the market and performing other errands where speed is required more than power. This kind of horse should not be expected to perform good service under the tongue of a heavy binder or at the end of a plow. Many farmers expect their horses to do heavy farm labor and then draw a buggy rapidly along the road when such work is desired. Horses of this type are as tall and long as the draft horses, but carry less flesh. They are, also, lighter in bone and muscle.

STANDARD OF EXCELLENCE FOR A DRAFT HORSE.

1. Weight, 1500 pounds or more.
2. Height, 16 hands or more.
3. Hair, fine and soft.
4. Skin, loose.
5. Action, as the horse moves away the feet should be picked up with a snap showing the sole of the foot clearly with each step.
6. Body, broad, deep. The distance between the shoulders and the point where the rump begins should be much shorter than the under line. A sloping shoulder is desirable but steepness of rump and low setting of tail are undesirable points.
7. Feet, large, wide on top and behind, turning neither in nor out at the toe.
8. General appearance, thrifty and vigorous.

STANDARD OF EXCELLENCE FOR A DRIVING HORSE.

1. Weight, 900 pounds or more.
2. Height, 15 hands or more.
3. Neck, long and slender.
4. Chest, less breadth, but greater proportionate depth than that of the draft horse.
5. Hair, fine and soft.
6. Skin, loose.
7. Action, as the horse moves the feet should be picked up and carried straight to the front. The feet should not be thrown out, making a circular motion rather than straight. The feet should not interfere with each other, nor show clumsiness of any kind.
8. Body, long, sloping shoulder, short back, and long, straight rump.
9. Legs, clean and smooth. The cannon on both front and hind limbs should approach the shape of a lath.
10. General appearance, vigorous, physical condition.

STANDARD OF EXCELLENCE FOR DAIRY COW.

1. Head, neck and chest, should be fine and indicate dairy qualities.
2. Form, deeper and wider in paunch than at the heart girth. The heart girth should be large enough to give ample room for the heart, lungs and other organs. The depth and width should gradually increase from front to rear. The backbone should be prominent and open jointed.
3. Skin, thin, loose, soft and mellow to the touch.
4. Hair, soft and fine.
5. Fore quarters, free from beefiness.
6. Hind quarters, the rump should be long, wide and level. Thighs thin and incurving.

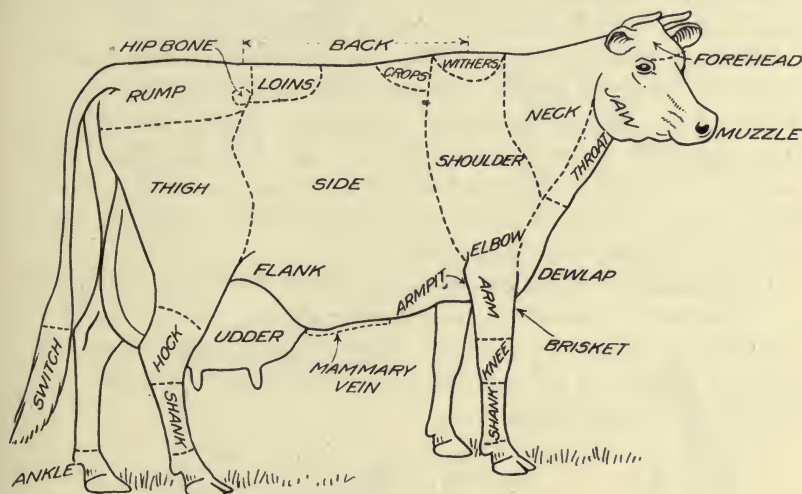


FIG. 10. POINTS OF DAIRY COW.

7. Udder, attached high behind and extending far in front. Quarters should be even, the teats evenly placed and of convenient size for milking. Prominent udder veins.
8. Milk veins, large long and crooked, passing through large openings into the body.

Lice.—During the month of January lice begin to appear on farm animals in large numbers. This is especially true of calves and colts. Lice should be prevented as they hinder the profitable growth of our young stock and sometimes stunt them to such a marked degree that they are in many cases unprofitable animals ever afterwards. Preventive measures should be taken whether

there are indications of lice or not. A remedy for prevention or destruction of lice on calves:

Dissolve one-half pound of soap in a gallon of water. To this add two gallons of kerosene. Mix thoroughly. Add 19 gallons of water and apply with spray pump or brush.

A remedy for prevention or destruction of lice on colts:

Kerosene, 1 part; linseed oil, 10 parts. Mix thoroughly and apply with a stiff brush.

Textbook References.—Nolan, p. 80; Burkett, Stevens and Hill, pp. 266–270; Davis, pp. 253–256, and p. 269.

Teachers' Reading.—Farmers' Bulletins 612 and 619; Maryland Agricultural Experiment Station Bulletin 121.

Practical Exercises.—(1) Take the members of the class to farms where draft horses, carriage horses and dairy breeds are kept and give the pupils practice in judging animals according to the standards given in this lesson. (2) Another good plan would be to have farmers to bring such animals to school on different days. Invite the county demonstration agent to meet with the class on such occasions.

Correlations.—Language: Have the members of the class make out standards of excellence on separate sheets. These should be used in the practical exercises. The notes taken in connection with the judging of animals should be written out in full and submitted as language exercises.

LESSON NINE.

Subject: ROPE.

Topic: Hitches.

The Timber Hitch.—The timber hitch is used in fastening a rope to a heavy log or piece of lumber. To make the hitch pass the rope around the log, then around the standing part of the rope. The hitch is completed by passing the end under and around the portion of the rope surrounding the log and drawing it up tight (fig. 11). The advantages of the timber hitch are: The fastening may be made quickly and securely, and the rope is easily and quickly removed.

The Half Hitch.—The first step of the half hitch is the same as that of the timber hitch. The hitch is finished by passing the

end under the rope surrounding the log only once and then drawing it up tight (fig. 12). This hitch may be used in fastening a rope to light pieces of lumber as scantlings and boards.

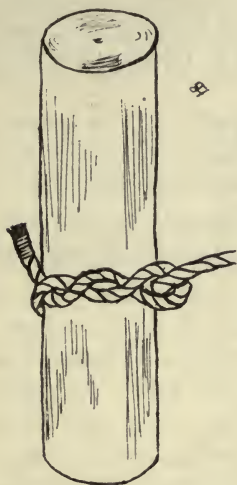


FIG. 11. TIMBER HITCH.

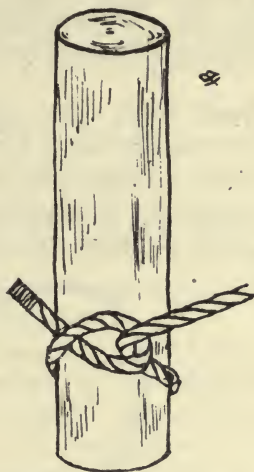


FIG. 12. HALF HITCH.

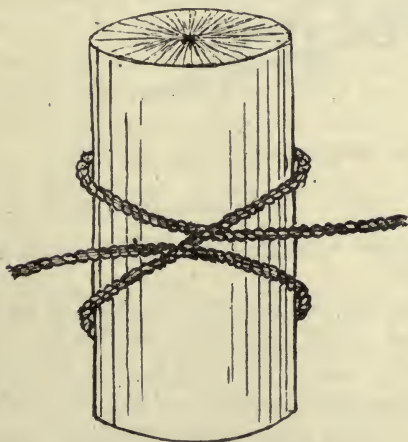


FIG. 13. CLOVE HITCH.



FIG. 14.
BLACKWALL HITCH.

Clove Hitch.—To know how to make the clove hitch is quite useful to anyone on the farm. This hitch is used in fastening a rope to a round, smooth body as a pump stock. If properly made,

this hitch will not slip. To make the clove hitch, pass the end once around the part to be fastened and over the standing part; pass the end of the rope around again, and finish the fastening by placing the end under the last turn of the rope, then draw it up tight (fig. 13). In drawing a pump stock out of a well, make the clove hitch in the rope and then push it down over the pump stock.

Blackwall Hitch.—The Blackwall hitch is used where it is desired to quickly fasten a rope to a hook. It is made by passing the rope through, and around the back of the curve in the hook; then under the standing part of the rope so that when the pull is made the bind will come on the part of the rope lying in



FIG. 15. RUNNING HITCH.

the bottom of the hook (fig. 14). The hitch may be made at any point in the rope by forming a bight and passing it over the hook as shown in figure 14.

Running Hitch.—The running hitch is used in fastening a rope to a ring. It is made more quickly than the bowline knot, and does not draw tight as is the case of the slip knot so commonly used. In making the running hitch pass the end through the ring, around the standing part several times on the inside of the loop thus formed, and once around the standing part on the outside of the loop (fig. 15). If made correctly the hitch will not slip or draw tight.

Textbook Reference.—Nolan, pp. 165–167.

Teachers' Reading.—Farmers' Bulletin 638.

Practical Exercises.—Practice the pupils in making the hitches described in this lesson. A piece of rope should be provided for the purpose.

Correlations.—Language and Drawing: After the several hitches have been made require the members of the class to relate the steps taken and to make drawings of the completed hitch.

LESSON TEN.

Subject: MANAGEMENT SUGGESTIONS.

Soil.—Take good care of all accumulated manure. If the fields are in condition to get on with a wagon and a team distribute the manure as it accumulates, otherwise store it carefully. This is a good month to clean up rubbish about the farm.

Farm Animals.—All farm animals should be well housed and fed this month. This is one of the coldest and most disagreeable months of the year and animals require careful attention. Butcher the remaining hogs. Corn is too expensive to feed to fattening hogs during cold weather. Begin to select and mate the flocks that are to produce eggs for incubation. Too much emphasis cannot be placed on the importance of this work. The character of the future flocks, depends upon what is done now.

Treat all young animals for lice. Calves, colts, and pigs that are damaged by lice already rarely make proper development.

Use the Babcock tester this month. The cows that are not giving satisfactory returns should be eliminated from the herd. Feed at this season is too expensive to use with unprofitable animals.

Improvements, Plans, Repairs.—Preparations should be made for taking in new land. This is a good season to make additions to barns and other buildings. For personal improvement the farmer should attend the short course at the agricultural college. He should also arrange to secure the publications of the Agricultural College and of the U. S. Department of Agriculture. In the mountainous section of the State heavy hauling should be done while sledding is good.

Prepare to keep an account of the year's business. Open an account book. Transcribe the farm inventory onto this book. Keep a daily account of receipts and disbursements. If time permits carry separate accounts with the more important phases of

the farm operations, such as dairying, poultry products, hog raising, and the like. Separate accounts should be carried with each farm laborer and with neighbors and others with whom continuous transactions are made.

Plans should be made to dispose of surplus products and to purchase necessary supplies and equipment for the year's operations.

All farm implements should be kept indoors, roads should be repaired as needed, harness and tools should be put in good state of repair. Waste lands should be cleared of briars and brush and preparations made for converting such places into pastures.

FEBRUARY.

Introduction.

This is the sixth of the series of publications in elementary vocational agriculture for the public schools of Maryland. The same plan is followed as for the previous months. The teachers should not fail to provide themselves with all the reference material. Remember that the best results cannot be had unless the subject matter of the lesson is supplemented with the material found in the bulletins of Maryland Agricultural Experiment Station and U. S. Department of Agriculture.

LESSON ONE.

Subject: CROPS.

Topic: Testing Seed Corn.

Importance.—The ears of corn that were selected and stored in the fall should be tested to determine the vitality or germinating power of the kernels. An ear may have the appearance of being well suited for seed but the kernels may lack sufficient vitality to germinate or produce a thrifty stalk. Even when a larger number of grains are planted in each hill than should be left to grow, the testing of seed is important to insure a stand of thrifty stalks. Among the signs of poor germination are a dark area near the tip of the grain and a shriveled tip. The germination test is the surest method of determining the vitality of seed.

The Germinating Box.—Any shallow box (fig. 1) of convenient size may be used for the germinating test. Such a box may be easily made from ordinary boards. The proper depth is 3 to 4 inches. The length and breadth depend upon the number of ears to be tested. Four square inches or checks 2 inches square should be allowed for the grains from each ear. The box should be filled with damp sand or sawdust to a depth of one or more inches, or should have placed in the bottom two or three thicknesses of flannel or similar cloth. These are to hold the moisture

necessary to enable the kernels to germinate. Over the moisture container should be placed a white cloth having the same dimensions as the inside of the box, and laid out in checks 2 inches square. Each check should be numbered to correspond to the number of the ear from which the kernels are taken. The numbers should be arranged in order. Another cloth should be provided to cover the kernels when they are placed in position and additional sand, sawdust, or flannel should be spread over this cloth.

Making the Test.—The ears to be tested should be numbered and placed in a rack. From different parts of each ear select six kernels. Place these on the check in the germinating box, the

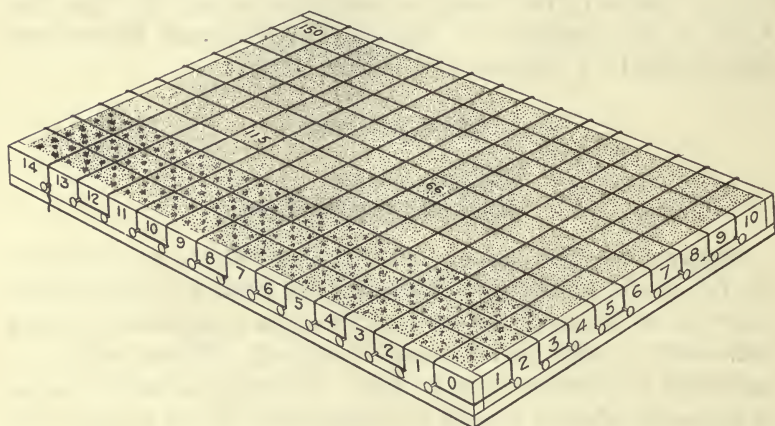


FIG. 1. GERMINATING BOX.

number of which corresponds to the number of the ear. Cover the kernels with the cloth and other covering material. If the material placed in the bottom of the box and that placed over the kernels has been carefully moistened, the box will need but little attention until the sprouts are ready for counting. If the cloths or other materials become dry before the seeds germinate, sprinkle over the surface. The germinating box should be kept in a warm room during the germinating period. The temperature of the room should not fall below 50° F.

Counting the Sprouts.—The kernels should begin to sprout about the fourth day, but counting should not be done until about

the seventh day. By this time the shoots should be 1 to 1½ inches long. If the six kernels in any one square show six good healthy sprouts, the ear from which they were taken should be used for seed. If any kernels fail to germinate or show weak sprouts the ear should be discarded.

Textbook References.—Davis, pp. 138–140; Burkett, Stevens and Hill, pp. 72–75; Buffum and Deaver, pp. 49–51; Nolan, pp. 197–200.

Teachers' Reading.—Farmers' Bulletins 253, 413, 537, and 617; Maryland Agricultural Experiment Station Bulletin 141.

Practical Exercises.—(1) Make a seed testing box and practice the class in the germinating test. (2) Each club member should prepare a germinating box and test the corn to be used for seed.

Correlations.—Draw and describe a germinating box showing the grains of corn in position.

Arithmetic: How many barrels of corn per acre are produced at the home of each member of the class. If by testing seed corn the yield can be increased one-fifth or 20 per cent, what would be the increased yield per acre? At each home?

If it requires 10 hours to test the seed corn for planting 10 acres, at the above rate of increase in yield, what would be the value of each hour spent in making the test?

LESSON TWO.

Subject: CROPS.

Topic: Red Clover.

Importance.—Red clover is one of the important crops of Maryland, especially in the northern and western parts of the State. Although it is grown in all parts of the State, it does not succeed so well on the light soils of southern Maryland and of the Eastern Shore.

Best Soils for Red Clover.—Although red clover will do very well on any soil that produces good corn, yet it does best on a deep fertile loam. Clover does not require that the soil be well supplied with nitrogen as it gathers its own supply. However, it draws heavily on the phosphorus and potash in the soil. Good drainage is necessary for growing clover successfully.

Preparation of the Land.—It is the custom in Maryland to sow red clover in February or March on land seeded to grain the pre-

vious fall. Sowing the seed on snow in February or on soil checked by freezing in March usually insures a good stand. Where clover is sown alone or at the same time as the grain, the seed bed should be prepared thoroughly. Although the seed bed should be firm, the surface should be finely pulverized. Newly plowed land should be disked or harrowed with heavy harrows to pack the soil before clover seed is sown.

Inoculation.—In order to make its best growth, the red clover plant must be supplied with nitrogen-gathering bacteria or germs on its roots. In sections where red clover has been commonly grown inoculation is not usually necessary for the soil is well supplied with the proper bacteria. In newly settled regions or in case of new lands where it is desired to introduce clover, inoculation is necessary.

The two methods of inoculation are: (1) The application of soil from fields where red clover has been grown, and (2) the pure culture method. Where soil is transferred from one field to another the results are likely to be more certain than from the pure culture method, but there is danger of introducing noxious weeds, insect enemies and plant diseases where soil is brought in from some outside locality. This should be carefully guarded against. A small amount of the inoculated soil should be thoroughly mixed with the seed when they are planted and additional soil at the rate of 200 or 300 pounds to the acre should be scattered on the land. This scattering of inoculated soil on the land is not feasible where it cannot be disked or harrowed immediately.

The pure culture method of inoculation is less certain as to results, but it is more easily transported and it is free from the danger of introducing harmful pests on the farm. This method may be carried out in two ways: (1) A bottle of pure culture is added to a convenient amount of water and this mixed with a considerable quantity of soil. The heated soil is then scattered on the land and harrowed in. (2) The pure culture is added to a convenient amount of water and with this the seed are moistened. Allow the seed to dry and plant immediately.

Fertilizers for Red Clover.—The crop ordinarily succeeds by utilizing the fertilizer that has been used in connection with the preceding crops or with the grain crop growing on the land. Where the soil is lacking in fertility it is well to top dress the land with several loads of manure previous to the time of seeding. If

manure is not available commercial fertilizer containing phosphoric acid and potash should be used in liberal quantities. Clay soils may need only 200 pounds of bone meal or 250 pounds of acid phosphate, but light sandy soils should have also an application of 50 to 100 pounds of muriate of potash per acre.

Sowing the Seed.—The common practice is to sow red clover on land that was planted to wheat the preceding fall or sow it with spring oats or barley. When sown on winter wheat the freezing and thawing of the soil usually cover the seed sufficiently. When red clover is sown alone the seed should be harrowed in well to insure a stand, unless seeders or drills are used. In seeding clover 8 to 10 pounds an acre are usually sufficient.

Textbook References.—Nolan, pp. 208-211; Buffum and Deaver, pp. 83-86; Burkett, Stevens and Hill, pp. 244-251; Davis, pp. 104-106.

Teachers' Reading.—Farmers' Bulletin 455.

Practical Exercises.—Write to the U. S. Department of Agriculture for red clover inoculating material. Give the members of the class practice in soil inoculation or seed inoculation. Follow the directions accompanying the inoculating material. It may be best to go to some nearby farm to perform this exercise.

Correlations.—Language: Require the members of the class to write out statements of the steps employed in making a pure culture inoculation of red clover seed. These facts should be copied in the class note book.

Arithmetic: Make a community survey as to the number of acres being seeded to clover in the community. Determine the total number of pounds of seed used in the community and find the cost of the seed at the prevailing price.

LESSON THREE.

Subject: ROPE.

Topic: Splices.¹

End Splice.—The end splice is used to keep the end of the rope from raveling, and to form a convenient and firm hand-hold. To make the end splice, unravel about 5 inches of the end of the rope (fig. 2, A), then holding the rope in the left hand take the right hand

¹ Three-eighths inch rope is a convenient size to use in this work.

strand and pass it around the middle strand. The left hand strand is then laid across this loop; the middle strand is then passed over the left hand strand and down through the loop made by the right hand strand, *B*. This part of the splice is finished by drawing

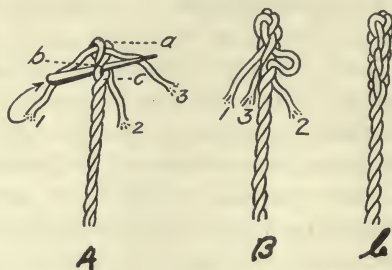


FIG. 2. END SPLICE.

the strands down tightly. Each strand should now point toward the main part of the rope. The next step is the weaving of the ends. This is done by crossing the strand lying next to the ends and under the next strand. About one-fourth of the strand

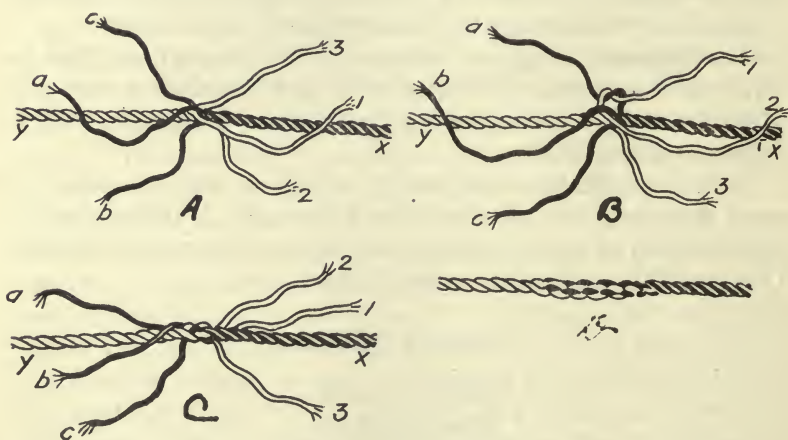


FIG. 3. SHORT SPLICE.

should be removed before each operation. The process should be continued until all of the ends are neatly woven, *C*.

Short Splice.—Unravel about 10 inches of the rope and place the ends together tightly (fig. 3, *A*) so that each strand will lie be-

tween two strands from the opposite direction. In order that the rope may be held in place twist two of the pairs of strands together. The third pair should now be tied with an over-hand knot, and each end woven once under the corresponding alternate strand as was done in the end splice (fig. 3, *B*). Repeat the same operation with each of the two remaining pairs of strands (fig. 3, *C*). The splice is finished by simply weaving in the ends and removing a part of the strand before each operation (fig. 3, *D*). The short splice may be used in repairing any rope that is not to be used over a pulley.

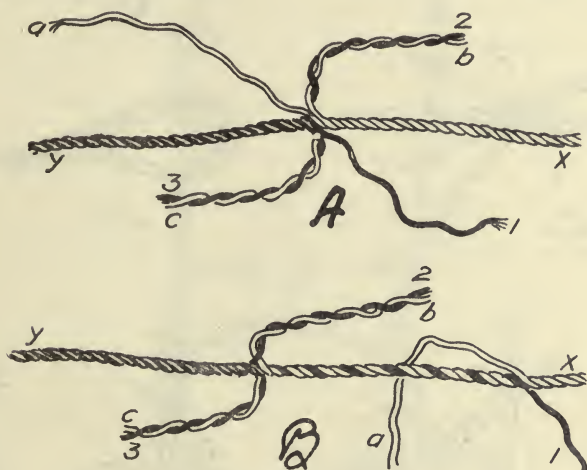


FIG. 4. LONG SPLICE.

Long Splice.—The long splice (fig. 4) is made in repairing a rope that is to be used in connection with pulleys, as in the repair of a hay rope. Open out the strands of the rope to a length of 18 inches for a half-inch rope and about 36 inches for an inch rope. Place the two ends together so that the strands from each end of the rope alternate, then twist together two adjacent pairs as was done in the short splice. Begin the splicing by untwisting the loose end of the left and neatly laying the loose end from the right in its place. Continue this until about 10 inches of the right-hand end is left. The next step is to tie an over-hand knot and then weave in the two ends, removing some of the fibers before each operation. Repeat the operation with one of the other pairs

of strands, finishing on the right-hand side. The splice is completed by weaving in the remaining pair of strands at the central point. When complete the rope should be the same size at the point of repair as elsewhere.

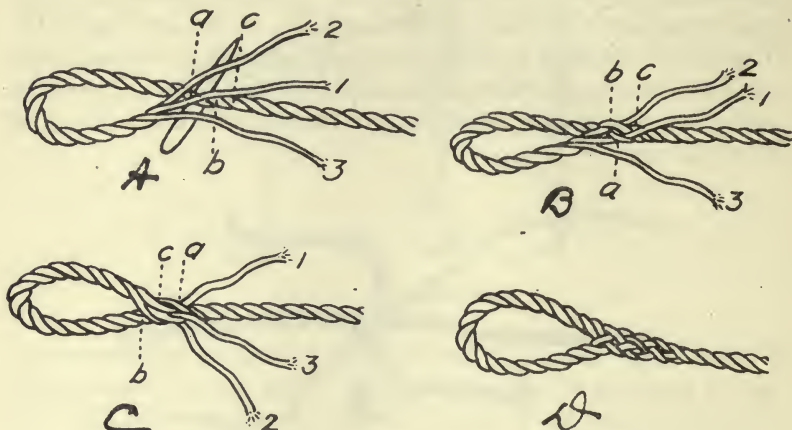


FIG. 5. EYE SPLICE.

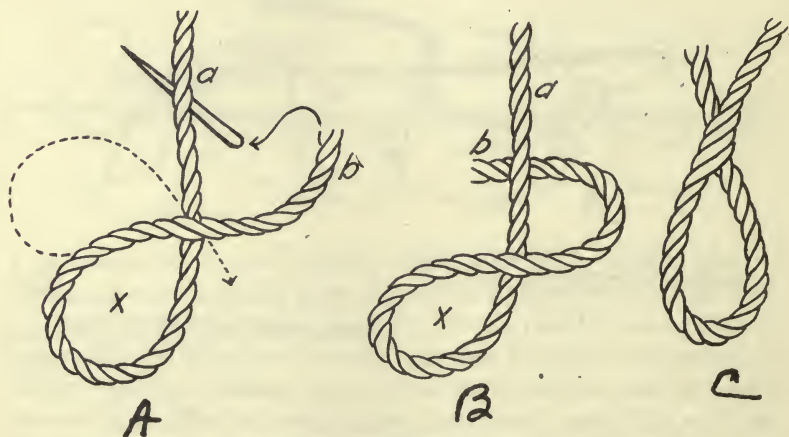


FIG. 6. LOOP SPLICE.

Eye Splice.—The eye splice (fig. 5) is used at the end where a permanent loop is desired. It is made by unfolding the strands of the end of the rope as was done in the case of the end splice and then weaving them into the main part of the rope at a selected

point. The point of splicing is determined by the size of the loop desired. The details of the weaving in of the strands is the same as that of the other splices. It gives greater strength to the eye splice to weave each strand several times before removing any of the fibers.

Loop Splice.—The splice (fig. 6) is similar to the eye splice except that it is made at a point in the rope other than the end. This splice is used in making the rope halter. To make the loop

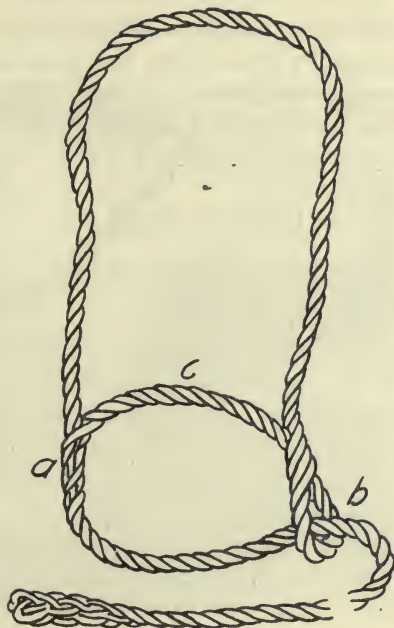


FIG. 7. ROPE HALTER.

splice raise a single strand in the rope at the point desired and pass an end of the rope under the strand so that the direction of the strands will be parallel. Then raise a strand in the loop in the part just passed under the single strand and on the same side, and pass the other end through. When finished the double strands will lie parallel.

Rope Halter.—To construct a rope halter (fig. 7) use about 12 feet of five-eighths inch rope. At one end construct a loop splice and an end splice so that they are about 7 inches apart. If de-

sired, the other end may be finished with an end splice or a whipped end. To adjust this halter, place the main part of the rope over the head of the animal and down through the eye splice; then pass it through the loop splice and draw it up to the size of the animal's head. The part of the rope between the eye splice and the loop splice passes over the animal's nose.

Practical Exercises.—Have the pupils bring pieces of rope to school and practice in making the loops described in the foregoing lesson.

Correlations.—Drawing: Make sketches of the loops made by the pupils. Geography: From what materials are ropes made? Where are those materials grown? Locate these countries on the map. Name other fiber crops and locate the states and countries in which they are grown.

LESSON FOUR.

Subject: HORTICULTURE.

Topic: Pruning.

Pruning is one of the most important as well as one of the most interesting phases of orchard management. Knowledge, experience, close observation and common sense are essential elements of its successful practice.

Objects of Pruning.—If intelligently performed pruning has one of the following objects in view:

(1) To train the tree to some desired form or shape. The various orchard operations must be performed and the trees must be so shaped that they can best carry their loads of fruit. Sunlight is essential to the coloring of the fruit. The tree should be so shaped that the greatest amount of sunlight may be admitted to all its parts.

(2) To increase or maintain the vigor of the tree. By removing a part of the branches the number of growing points or buds is reduced. This enables the remaining buds to grow more vigorously. This is best accomplished by pruning while the tree is dormant.

(3) To induce fruitfulness. Young vigorous growing trees often continue to use up all their energy in wood growth long after they should be expending a part of it in fruit production. This may be accomplished by pinching or cutting back the termi-

nal buds during the growing season. The best results will be obtained if it is done just after the growing season has reached its maximum and is starting on the decline.

(4) To prevent some impending evil to the tree, to check or eliminate disease. Dead or dying branches should be promptly removed. They are useless and more or less endanger the well being of the tree.

Season for Pruning.—The milder kinds of pruning like pinching, disbudding, and cutting young shoots and the removal of injured branches may be done whenever the necessity is appar-



FIG. 8. IMPROPER CUT.

ent. The regular annual pruning, however, is usually most advantageously done during the dormant period. Late winter and early spring is usually the most convenient and desirable time. In the case of grapes and other plants that are likely to bleed from wounds the pruning should be done before the sap starts to flow.

In starting to prune your trees do not start at the bottom and prune upward and outward along the branches. This is the most common mistake and its effects are hard to overcome. This produces long bare-limbed, top-heavy branches. It forces all the

growth at the ends of the branches making them too long and too dense at the ends. By commencing at the top and pruning inward to side branches the top becomes open and sunlight is admitted.

Where and How to Make and Treat the Cut in Pruning.— Since the movement of prepared food is from the leaves towards the roots it follows that when the branch is cut off at some distance from the trunk (fig. 8) the wound cannot heal unless there are leaves beyond the wound to make a growth current possible.



FIG. 9. PROPER CUT.

The cut should therefore be made close enough to the supporting member (fig. 9) so that it can be healed from the cambium of the latter. There is usually a more or less distinct swelling about the base of a branch. A branch cut off just above this swelling or ring will usually heal promptly, but if the cut is made much farther out it will not. It is important that the wound should not be larger than necessary, and for that reason it is generally best to make the cut at right angles to the branch. In cutting off

large limbs it is best to cut a way into the limb from the bottom. If it is attempted to saw through the limb from the upper side the weight is likely to split the branch and injure the supporting member.

Wounds so large that they cannot heal promptly should be painted with a good oil paint. White lead is preferable, and, if desired, enough sienna may be added to make the paint about the color of the bark.

Textbook References.—Davis, pp. 189–192; Burkett, Stevens and Hill, pp. 83–88; Nolan, pp. 221–225.

Teachers' Reading.—Farmers' Bulletins 181, 471, 491, and 632; Maryland Agricultural Experiment Station Bulletins 72, 92, 130, 144, 159, and 178.

Practical Exercises.—(1) Take the class to a nearby orchard and observe the work in pruning. An engagement should have been made previously with the owner. If possible, have the county demonstration agent meet the class at the orchard. (2) Plants growing on the school ground should be pruned by the pupils of the class under the supervision of the teacher, an experienced farmer, or the county demonstration agent.

Correlations.—Drawing and Language: Make drawings of proper and improper cuts in pruning. Describe and make drawings of pruning implements.

LESSON FIVE.

Subject: POULTRY.

Topics: { (1) Saving Eggs for Incubation;
(2) Preserving Eggs for Use.

Collecting Eggs for Incubation.—Eggs that are to be used for incubation should be very carefully handled. They should be gathered several times daily both in warm or cold weather. Oftentimes poor hatches are obtained because the eggs or some of them have been chilled when in the nest or they have been kept warm all day by the laying hens and incubation started.

Eggs have a thin substance on the shell called "bloom" which should be harmed as little as possible while the eggs are handled before incubation. If clean nests are provided little trouble should be had, but if the eggs become dirty and have to be washed the shells are injured and will not keep so well. If possible, select

only naturally clean eggs for hatching. Where they are only slightly soiled, clean carefully only the part that needs it. Under no circumstances should dirty eggs be set. If you have to set washed eggs, do not keep them longer than necessary.

Selecting Eggs for Incubation.—Select only well-shaped eggs for hatching for in time this selection will give fowls that will lay a better shaped egg. Another reason is that ill-shaped eggs do not often hatch. These poor-shaped eggs are usually caused by some abnormal condition of the hen's egg organs which injure the contents as well as the shell structure. Abnormally large eggs or very small ones do not usually hatch well, and double-yolked ones seldom hatch. Some select a certain shaped egg thinking that pullets will hatch from them, but there is nothing in it. Round eggs do not always hatch pullets nor long ones hatch cockerels.

Care of Eggs for Incubation.—Eggs for incubation should be set as soon as possible after laying. As soon as they have been laid they start to dry out and normal chicks cannot be hatched from them. If they are kept in a good dry place they often give good results when saved a week or ten days, but there is considerable risk in saving them longer than ten days. Often when eggs from good strong stock are set apparently good hatches are obtained from eggs kept three or four weeks, but the chicks would be stronger and better if the eggs had been fresher.

Keep the eggs in a cool, clean, not too dry place, while awaiting incubation. Incubation starts when the temperature gets much above 70° F. which is the temperature of most living rooms. A good clean cellar is usually a suitable place in which to keep eggs for hatching. A temperature of between 40 and 50 or 60 degrees is good. If the room is naturally very dry you might set some water in shallow pans near the eggs. Eggs kept in dirty places often get molds or bacteria on them which injure the young chicks when they hatch.

Some claim that eggs for hatching should be turned daily, but if they are only saved a few days this is hardly necessary. When they are saved more than a week it is probably wise to turn them occasionally. Where large numbers are to be kept they can be put into an ordinary egg crate and this can be turned over each day. Regular egg cabinets with facilities for turning are on the market and are used by some.

Time to Select Eggs for Preserving.—The proper time to preserve eggs for future use is during the spring months when eggs are plentiful and also because those laid in the spring when the hens are in good condition keep better.

Eggs to Select for Preserving.—Eggs from hens which do not have a male bird running with them (infertile eggs) will keep better than fertile eggs:

Fresh eggs can be preserved better than those that have been laid for some time. Clean, unwashed eggs keep better than dirty or washed ones.

Methods of Preserving Eggs.—There are several methods of preserving eggs but only two of which are very commonly used. The method most often used especially by the large dealers is the cold storage system. Eggs fresh when put into cold storage keep very successfully and the storage men seem to do pretty well with ordinary eggs. There is, however, a very large annual loss from eggs put down in storage because they were not cared for properly by producers and handlers. Most farmers and egg producers cannot have cold storage plants of their own but can often have their eggs stored at a nominal cost in large storage plants in the cities.

Many eggs are put down for home use each spring in a solution of water glass (sodium silicate). This is a very simple method and usually a very successful one. The solution is made up of nine parts water which has been previously boiled and allowed to cool, and one part of water glass, by measure. This is put into an earthen crock or wooden vessel and the eggs put in, being sure that there is at least two inches of the solution above the eggs. A tight cover of some kind can be put on or a film of paraffin can be floated over the top to keep down evaporation. The whole should be put in a cool place like a cellar until ready for use. A new preservative in powdered form has recently come on the market. When dissolved according to directions the same water glass solution mentioned above is obtained.

Teachers' Reading.—Farmers' Bulletins 287, 528, and 562; Maryland Agricultural Experiment Station Bulletin 171.

Practical Exercises.—(1) Make an egg tester similar to the one described in Farmers' Bulletin 562 and give the pupils practice in testing eggs. A few eggs should be brought to school by each member of the class for the purpose. (2) Require the members

of the class to report in writing as to the methods employed at their homes in collecting and keeping eggs for incubation and for home use. All club members should select or purchase eggs for their poultry project.

Correlations.—Language: Describe the egg-testing equipment prepared by the pupils.

Drawing: Make drawings of different eggs as they appear when examined in the tester.

LESSON SIX.

Subject: GARDENING.

Topics: { (1) Preparing the Hotbed.
(2) Preparing Soil and Planting Vegetables.

Advantages of Hotbeds.—(1) Delicate plants may be started early without danger of loss by frosts. (2) The presence of weeds makes it difficult to cultivate small, delicate plants. This may be overcome by starting the plants in the hotbed and transplanting them after they have attained sufficient size. (3) Garden crops placed on the market before their regular season bring a higher price. It is possible to produce very early vegetables by starting them in a hotbed. (4) By growing plants to considerable size in a hotbed it is possible to avoid injury from insects or plant diseases.

The Location of Hotbeds.—(1) A hotbed should be near a water supply. (2) It should be convenient to the garden and farm buildings. (3) Protection from cold winds is essential. Such protection may be provided by buildings, hedges, or board walls. (4) South or southeastern well-drained exposures are preferable.

A Temporary Hotbed.—This is the type of bed most commonly used on the farm. Make an excavation of 6 or 8 inches and as large in area as desirable. Use well rotted stable manure to fill the excavation and spread the manure above the surface of the ground so that it will have in all a depth of 16 to 20 inches. The manure should be thoroughly packed, and, if necessary, should have leaves or straw mixed with it to prevent its being soggy. After the surface of the manure has been leveled, the frame should be placed in position.

The frame should be of proper size to carry the sashes. The rear board of the frame should be 4 to 6 inches higher than the front board to enable the glass to drain well and to enable the rays of the sun to strike more directly. After the frame is placed in position the manure should be packed around the boards on the outside and a layer of 3 to 5 inches of rich garden soil should be placed over the manure within the frame (fig. 10). As the temperature of the bed will run quite high for three or four days, no seeds should be planted within that length of time.

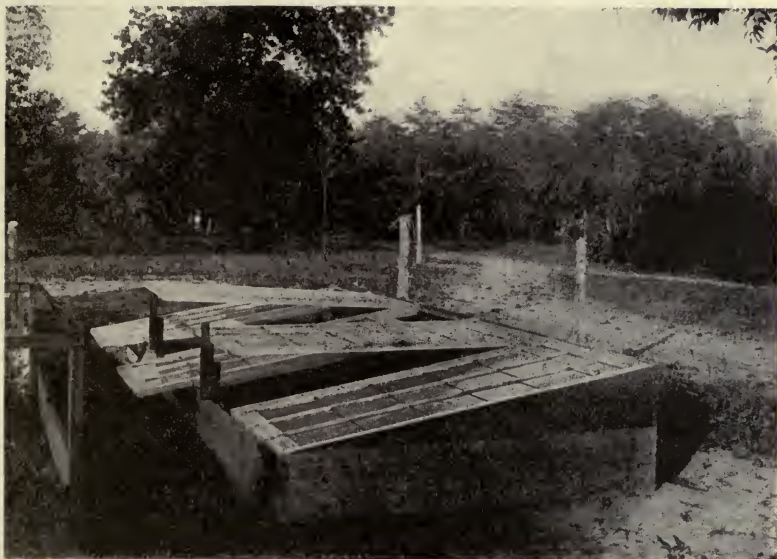


FIG. 10. A SUITABLE FRAME FOR A HOTBED OR A COLD FRAME.

The hotbed should be covered with glass. Sashes of standard size are made. These are usually 3 feet by 6 feet. During extremely cold weather the frames should have additional covering, such as burlap, straw mats or old carpet. This extra protection is necessary especially on extremely cold nights. During the warmer days it is necessary to raise the sashes for ventilation.

Permanent Hotbed.—The heat for the permanent bed may be provided by fermenting manure, a stove, a brick flue, or by means of steam or hot water heated pipes radiating from a dwelling or other heating plant. Manure is more commonly used on farms.

For a permanent bed in which manure is to furnish the heat, a pit 24 to 30 inches in depth should be provided. The sides and ends of the pit may be supported by brick walls or by a lining of 2-inch plank held in place by stakes. The pit should be packed level full of manure. The frame should be placed around the boards on the outside. A layer of 3 to 5 inches of rich garden soil should be placed over the manure on the inside of the frame. After three or four days the bed is ready for the planting of seed. Beds should be watered only in the mornings of bright days.

Preparing Soil.—Fertilizer in liberal quantities should be distributed over the garden and plowed under as soon as the soil is in proper condition. After the soil has been turned harrow it often to keep it in a finely pulverized state. If well-rotted manure is not available, commercial fertilizer rich in available phosphoric acid and potash should be used. Unless the soil is very rich ten to twelve loads of manure or 1000 to 2000 pounds of commercial fertilizer should be used per acre.

Planting.—Start in the hotbed cabbage and lettuce. In southern Maryland peas, potatoes, onions, parsnips, and radishes may be planted in the open.

Textbook References.—Davis, pp. 174-177; Burkett, Stevens and Hill, pp. 91-96; Buffum and Deaver, pp. 154-156; Nolan, pp. 167-168, and 238-240.

Teachers' Reading.—Farmers' Bulletins 255 and 647; Maryland Agricultural Experiment Station Bulletin 126.

Practical Exercises.—(1) Have the pupils make a temporary hotbed for the school. Sow seeds to start plants in the school garden. (2) Require each member of the class to submit a written report in the construction of the hotbed used at home of each.

Correlations.—Language: Written work is provided for by the reports required in the practical exercises.

Drawing: Outline a hotbed.

Arithmetic: Develop problems on the cost of hotbed frames and sashes used at the homes of the pupils. Have pupils report the dimensions of hotbeds as a basis for these problems.

If each plant occupies a space $1\frac{1}{2}$ inches square in the hotbed, determine the number of plants that may be started in the various hotbeds reported by the pupils. Find the number of plants that could be started in a hotbed 6 feet by 9 feet.

LESSON SEVEN.

Subject: MANAGEMENT SUGGESTIONS

Soil.—Do all the plowing possible this month. A great deal of plowing can be done in southern Maryland, and if the weather is open, some should be done in northern and western Maryland. Clean up the land, open all ditches and lay out new ones. Place orders for lime and fertilizers. Continue to broadcast manure on the land.

Crops.—Sow red clover seed. In southern Maryland oats should be planted if there is a period of open weather. Test seed corn.

Horticulture.—Prune the orchards and small fruits. Plant shrubbery and top-dress the lawn with manure. Prepare hotbeds and sow cabbage, lettuce, and pepper seeds in the hotbed. In southern Maryland plant in the open onions, potatoes, radishes, parsnips and spinach. Fertilize the garden well and prepare seed beds for later planting.

Farm Animals.—Get the horses ready for the rush of work that is coming on later. Gradually increase the feed and groom the animals well.

Milk cows should be fed well this month. A good flow of milk should be kept up until the spring pastures are ready. If the flow is permitted to drop off at this time it will be difficult to increase it later.

Clean and whitewash poultry houses. Eggs that are to be used for incubation should be carefully collected and tested. Exercise care in keeping the eggs. Begin to set hens or start the incubator. If a new stock of poultry is to be introduced, place an order for eggs this month.

Plans, Improvements, Repairs.—Keep a small memorandum book to assist your memory in recalling the things you wish to do on rainy or stormy days. This book may be used for noting the expenditure or the receipt of funds. At night such items should be entered in the regular book used for keeping farm accounts. Do not neglect the bookkeeping. By giving daily attention to this important matter the habit soon becomes fixed. Buy time and labor saving implements.

Lay out and grade walks around the house and barn. Use the split-log drag on the roads and driveways. Install conveniences

for the kitchen and the house. There should be running water in every farm home.

Repair old machinery, plows, harness, buildings and fences. Every farm should have at least a limited equipment of blacksmithing and harness-mending implements. These save both time and money.

LESSON EIGHT.

Subject: NATURE STUDY.

Plants.—Take the dimensions of the school grounds and indicate the locations of buildings and the like. Write to the Maryland Agricultural College giving the foregoing facts and asking that a plan showing the location of walks, shrubbery, flowers and trees be prepared for your school. Secure the coöperation of parents and friends and prepare to lay out walks and do the planting suggested in the plan furnished by the College.

For shades silver maple and weeping willow are very satisfactory. If the school grounds are not enclosed with a fence, privet makes a beautiful hedge and a substantial enclosure. There are places about the school grounds that should be screened. The snowball is a beautiful plant and well suited to such a use. For beds and borders the following flowers are suitable: Sweet Williams, pansies, sweet violets, white verbenas, petunias and zinnias. Prepare and fertilize the soil and get ready to plant the seed this month or next.

A splendid opportunity for plant study is afforded by window boxes. In addition, they add much to the appearance of the schoolroom. To make a window box observe the following directions:

(1) Secure or make a box 7 inches deep, 8 to 10 inches wide and as long as the window is wide.

(2) Bore several small holes in the bottom of the box; place over these broken pieces of pottery or crockery, then a half-inch layer of pebbles or small stones. Cover these with an inch layer of leaf mold or fine trashy matter and finish filling the box with soil consisting of one part pulverized manure, one part garden soil and one part sand.

(3) Water thoroughly and let stand for two or three days, and add more soil if it settles.

(4) When the soil becomes mellow so that it falls apart when compressed lightly within the hand it is in right condition for planting seed.

(5) Make slight depressions about 2 inches apart with the edge of a straight board. Sow any of the following kinds of seeds: petunias, begonias, pansies, sweet alyssum, and geraniums. If a variety of colors and flowers is desired, sow two or more kinds.

(6) Water frequently in the late afternoon and keep the box indoors when the weather is very cold.

Animals.—Birds: Make a list of all the birds seen in the community this month. These consist of permanent residents and winter residents. To encourage birds to visit the school grounds the pupils should collect scraps of meat, mixed grain and luncheon remnants for them. Place the bird food in convenient places about the school yard. Study the birds that visit the grounds and compare them with the list made out in October. Answer these questions: What birds have gone South for the winter? What birds have remained during the winter? What birds have come into the community from farther North?

Answer the following questions about birds:

1. Of what does the birds' clothing consist?
2. How are the feathers arranged on a hen's back? Breast? Neck? (Have a hen brought to class for study.)
3. Compare a feather from the back and from the breast. Note the difference.
4. Are both ends of a feather alike? How do they differ? Why?
5. Are some feathers all fluff or "down?"
6. At what age are the feathers of a bird all "down?" How are they protected from the winter at this age?
7. What is a pin feather?
8. How does a hen oil her feathers? Where does she get the oil? Why does she oil her feathers? Have you seen a hen or bird oiling her feathers?
9. Make a list of materials being eaten by birds at this season.

Wild Mammals.—A study of the cottontail is important at this time since it is likely to be damaging orchard trees and shrubbery. When snow is on the ground and food is scarce the cottontail often eats the green bark of young fruit trees. Young trees and shrubs should be watched closely, and if it is evident that they are being injured by rabbits the trees should be protected and the cottontails destroyed. Sheets of heavy paper, pieces of

old carpet or burlap may be wrapped around the body of a tree as a means of protection. Boys with dogs and guns can usually get rid of the cottontails. Use the following outline in studying the cottontail:

1. Describe the cottontail's track.
2. What time of day does the cottontail move about?
3. How does it spend the day?
4. What are the two most noticeable parts of the rabbit—ears, hind legs?
5. How does the rabbit hold its ears—When resting? When startled? When locating a noise? When running?
6. How does the rabbit move its head to detect an odor?
7. Note the upper lip, the teeth, the whiskers, the location of the eyes, the front legs and the hind legs.
8. Describe the rabbit's coat. What is meant by a rabbit "freezing?"
9. What kind of a nest (form) has the rabbit?
10. Name some of the rabbit's enemies. How does it evade or combat each?
11. What do rabbits eat at this season? Have some member of the class to capture a rabbit and bring it to school for study.
12. Compare the cottontail with the gray squirrel and the field mouse.

References.—Farmers' Bulletins 54, 369, 455, 496, 497, 506, 609, and 630.

Correlations.—Language work is provided in taking notes on the work done and the observations made with plants and animals.

Drawing: Sketch a window box. Outline the feathers taken from the different parts of the hen's body. Make a sketch of a cottontail in different postures.

LESSON NINE.

Subject: SCHOOL GROUND IMPROVEMENT.

Topic: A Suggestive Plan.

NOTE: The accompanying plan and planting table with explanation are given as a suggestion to teachers and pupils of small schools. The plan and the planting table should be carefully studied so that with suitable modifications it may be adapted to the local school grounds. After having studied this plan very carefully the teacher and pupils should make a plan for their own grounds and with the coöperation of the patrons lay out and grade walks, secure and plant trees and shrubbery, and fertilize and seed borders and beds. Let it be understood that this is no small undertaking, but with the coöperation of teacher, pupils and patrons it can be accomplished. The result will be an attractive school ground,

happy teacher and pupils and interested patrons. The day on which trees and shrubbery are planted should be made quite an occasion. The work of planting should be interspersed with appropriate songs, recitations, and talks.]

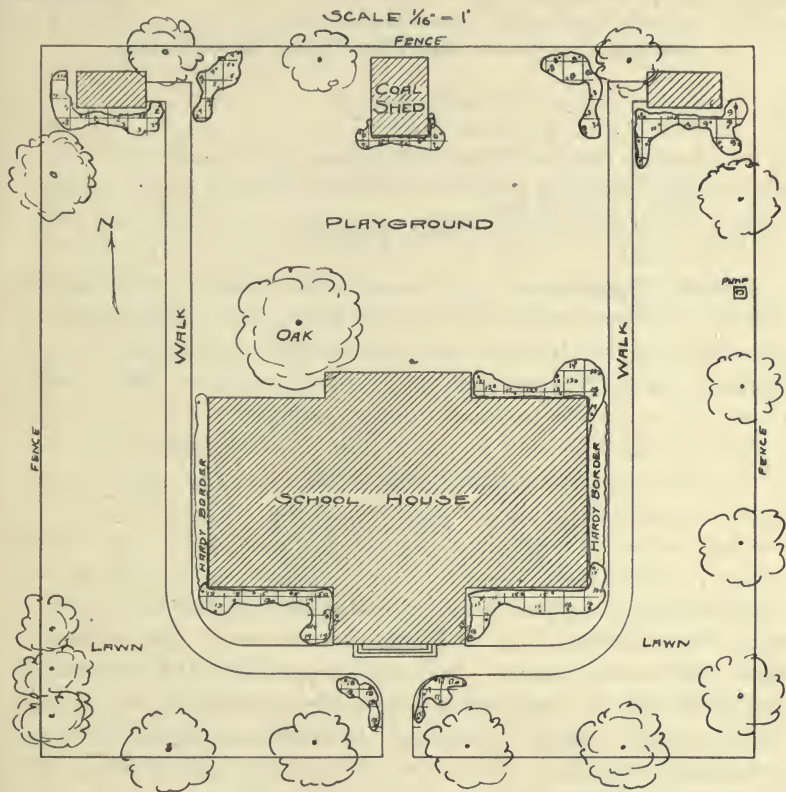


PLATE 1.—PLAN FOR SCHOOL GROUNDS.

LIST OF PLANTS.

Key No.	Variety.	No. of Plants.
1.....	Cydonia japonica (Japanese Quince).....	4
2.....	Philadelphus grandiflora (Mock Orange).....	5
3.....	Cornus stolonifera (Red twigged dogwood).....	7
4.....	Dieuilla Eva Rathke (Weigelia).....	5
5.....	Spirea Van Houttei (Bridal Wreath).....	7
6.....	Spirea opulifolia (Nine bark).....	5
7.....	Berberis vulgaris (Barberry).....	3
8.....	Sambucus canadensis (Elderberry).....	5
9.....	Viburnum opulus (Snowball).....	4
10.....	Syringa vulgaris (Lilac).....	4

<i>Key No.</i>	<i>Variety.</i>	<i>No. of Plants.</i>
11.	<i>Spirea Prunifolia</i> (Plum leaved spirae).....	4
12.	<i>Kerria japonica</i> (Globe Flower).....	4
13.	<i>Synphoricarpus vulgaris</i> (Coralberry).....	3
14.	<i>Berberis thunbergia</i> (Japanese Barberry).....	8
15.	<i>Hydrangea paniculata grandiflora</i> (Large leaved Hydrangea).....	6
16.	<i>Spirea</i> (Anthony Waterer).....	5
17.	<i>Rosa Rugosa</i> (Japanese Rose).....	5
18.	<i>Dentzia gracilis</i> (Slender Dentzia).....	5
19.	<i>Symphoricarpus racemosa</i> (Snowberry).....	4
20.	Dorothy Perkins Rose.....	2

Trees are Norway Maples, already planted.

Planting Suggestions.—In the hardy borders many of the native plants as the butterfly weed, asters, ferns, etc., may be planted. In addition these borders may be utilized to grow many of our common flowering annuals and perennials from seed. Later these can be planted in the shrubbery borders.

Since a walk is to be of service mainly during inclement weather, it should be so constructed that it is well drained and provides good footing during rainy weather. Where sufficient funds are available concrete walks should be laid. Seldom do funds permit of such construction. Gravel walks properly made will be dry and firm for a long period. For best results dig out to a depth of one or two feet and fill in with boulders and rocks, then with finer rocks and coarse gravel. Roll and tamp thoroughly so that all the layers will be compacted. Where gravel cannot be procured cinders may be used. These are obtainable at practically every school ground. Keep the surface of the walk nearly flat so that there is just a slight crown to shed water.

In laying the walks be careful to see that no basins are formed as the walks go through the low places. In such places a tile drain should be placed under the walk so that the water may run through it to the other side.

Paint the fences and outbuildings some harmonizing color as landscape green, or gray. See that they are kept in a good state of repair.

Various climbers may be planted along and trained to the fences. The trumpet creeper and woodbine are well suited for such planting. These can be found growing wild in many parts of the State.

Many native trees and shrubs that are well adapted to planting on school grounds can be found in the woods near by.

MARCH.

Introduction.

Teachers should constantly bear in mind the importance of supplementing the subject matter contained in these lessons with materials found in Maryland Agricultural Experiment Station Bulletins and Farmers' Bulletins of the U. S. Department of Agriculture. These publications may be had without cost so long as available by writing to the Maryland Agricultural College, College Park, Md., and to the U. S. Department of Agriculture, Washington, D. C. This is the seventh number of the monthly series of lessons.

LESSON ONE.

Subject: SOIL.

Topic: Liming the Soil.

Kinds of Lime.—Although many trade names are given to lime, there are only three general classes of lime; namely, burnt lime, hydrated (slaked) lime, and ground limestone or oyster shells. Burnt lime is obtained when either limestone or oyster shells is heated to high temperature. Hydrated (slaked) lime is burned lime with enough water added to slake it. Ground limestone or ground oyster shells is the raw material ground to a powder without further treatment.

The Value of Lime.—Lime supplies plant food; it acts upon the soil, making other plant food available; the acidity or sourness of the soil is overcome by the application of lime; it makes heavy, clay soils more porous and sandy soils more compact.

The kind of lime to apply depends almost entirely upon the relative cost of the different forms. The principal function of lime is to correct acidity. Any form will do this but it requires practically twice as much ground limestone or oyster shells, and one and one-fourth times as much slaked lime as burned lime to do the same amount of good. The effectiveness of ground lime depends upon the fineness to which the raw material is ground.

There is no material difference in the value of lime derived from limestone or oyster shells. The kind that is more readily available at less expense should be used.

How to Apply Lime.—The method of spreading lime depends upon the kind used. Lump lime may be placed in a large pile to slake and then spread with a manure spreader, or it may be placed in small piles over the field, and after slaking spread with shovels. If the latter method is used, 20-pound heaps (one peck) placed 20 feet apart each way or one bushel placed 40 feet apart each way will provide about one ton an acre. The small piles slake more readily than the larger ones. The most convenient way to distribute ground stone or slake lime is with a lime spreader. Never mix lime with manure or commercial fertilizers. The lime should be applied some weeks before fertilizer is added to the soil.

Amounts of Lime to Apply.—It is generally the best practice to apply not less than one ton of burnt lime, and one and one-fourth tons of slaked lime or two tons of ground limestone or oyster shell per acre. Such an application need not be given oftener than once in five years which makes the cost not more than 50 cents to one dollar per acre.

When to Apply Lime.—One of the best times to apply lime is just after the land has been plowed for the corn crop. The processes required in preparing good seed bed and in cultivating the corn crop thoroughly mix the lime with the top layers of the soil where it will be most effective in overcoming the acidity of the soil. In the fall when preparing the land for wheat is a suitable time for applying lime.

Textbook References.—Nolan, p. 152; Buffum and Deaver, p. 29; Burkett, Stevens and Hill, pp. 315–318; Davis, pp. 75, 76.

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletins 110 and 166; Farmers' Bulletin 77.

Practical Exercises.—(1) Place a small piece of burnt lime on a board or paper until it crumbles to powder. This powder is called air-slaked lime. (2) Place a second lump of burnt lime in a dish and wet it with a little water from time to time until it heats and crumbles. It will be noticed that the lime slakes more readily when water is applied. Lime should be slaked before applying it to the soil.

Correlations.—Language: Describe what takes place in the foregoing practical exercises.

Arithmetic: At the prevailing prices of lime find the cost of applying a ton an acre to a 10-acre field. Develop other similar problems. What is the weight of a barrel of lime? What is the weight of a bushel of lime? How many bushels of lime necessary to apply a ton an acre on a 10-acre field? How many barrels of lime for the same area?

LESSON TWO.

Subject: CROPS.

Topics: { (1) Begin Preparations for Alfalfa Planting.
(2) Fertilization of Grasses.
(3) Preparing Seed Beds.

Crops to Precede Alfalfa.—Preparation should be made at this time for sowing alfalfa. The best time to sow alfalfa is in late summer or early fall, hence the necessity of planning in advance for the planting of this important crop. The best crop to precede alfalfa is early potatoes. The fertilizer and cultivation necessary for the potatoes put the soil in an ideal condition for alfalfa. After the potatoes are dug, disking or harrowing is usually all that is necessary to obtain an ideal seed bed. If a heavy growth of weeds has taken possession of the land, plowing must be resorted to. Cowpeas and soy beans are excellent for preceding alfalfa. On fertile soil it is best to cut the crop for hay and prepare the seed bed by surface working as in the case of potatoes. If the fertility or supply of vegetable matter is low, the crop should be plowed under about the first of August. The seeding of alfalfa should not be done, however, until after the land has had time to settle sufficiently to insure a firm seed bed.

Alfalfa may follow wheat, oats, clover, or timothy. The land should be thoroughly plowed after harvesting and worked frequently until time to seed alfalfa.

Applying Fertilizers to Timothy and Alfalfa.—Timothy: Extensive tests at the State Experiment Station show that nitrate of soda and acid rock phosphate when used in combination give the best results. The proper amount to use depends upon the soil, but ordinarily nitrate of soda should be applied at the rate of 150 to 300 pounds per acre and the phosphate at the same rate. The fertilizer should be applied in the spring when the grass begins to green. This is usually the latter part of March or the first of April.

Alfalfa: If the alfalfa land has not been treated with an abundance of good clean manure either before it was plowed for planting or during the early winter, it should receive in early spring a top dressing of 300 to 500 pounds of acid rock phosphate and 50 to 75 pounds of muriate of potash per acre.

Seed Beds.—All lands not previously plowed should be turned this month. Fresh plowed land should be disked immediately. Sod lands that were plowed in the fall or winter should be kept in good tilth by disking. The work expended in preparing the soil for the crops brings as good or better returns than any work done during the year.

Textbook References.—Seed Bed: Burkett, Stevens and Hill, pp. 198, 205, 208, and 210; Buffum and Deaver, pp. 46-48; Nolan, pp. 272-277; Davis, pp. 70-73.

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletin 118; Farmers' Bulletins 318, 339, 400, 414, 424, and 537.

Practical Exercises.—(1) Club members should be preparing their seed beds. If necessary, lime should be applied to corn land; well rotted manure should be applied to the tomato plats. (2) Have the members of the class submit written reports on the kinds of implements being used on the several farms in the preparation of seed beds.

Correlations.—Language: Written reports required in Exercise 2 furnish suitable language work.

Arithmetic: Find the cost of the fertilizing materials to be used by the club members in connection with their projects.

History: Have the members of the class secure information as to the kinds of implements that have been used in the community for preparing seed beds. Let this information date as far back as reliable and be concerned with turn plows, harrows, and the like.

Geography: The Persians were the first nation to grow alfalfa. The Persians carried it to Greece. From Greece it was introduced into Italy, then into Spain, and from Spain it was carried to South America and Mexico. From Mexico it was brought into the United States. Locate all of these countries on the map.

LESSON THREE.

Subject: THE ORCHARD.

Topic: Spraying.

Apples and Pears.—If the trees are badly infested with San José scale it is advisable to apply the first spray in the fall after the leaves have fallen. For this purpose lime sulphur may be used at the rate of one gallon to 9 gallons of water. This should be repeated in the spring before the buds open. Unless the trees are badly infested with scale, the fall spraying may be omitted. For the spring spraying the lime sulphur should be used as it helps also to control certain fungus troubles.

The next spray should be applied within a week after the petals fall. This is the most important spray of the season, and should be very thoroughly done. Prepare the spray as follows: Arsenate of lead paste, 2 pounds; commercial lime sulphur, 5 quarts; water, 50 gallons. This is a combined insecticide and fungicide, and is primarily directed against the codling moth. The object is to drive the spray into the calyx end of the blossom before the calyx closes, for it is at this point that the young worm enters the fruit. The spray should be repeated in three or four weeks, using the same materials.

These four sprayings will generally give the apple orchard ample protection, except from the second brood of the codling moth. Spray for this brood as before, between July 15 and August 1. On the other hand, in some sections it may become necessary to spray several times in addition to those outlined.

Peaches and Plums.—(1) Spray with commercial lime sulphur, usual strength (one to nine), before the buds swell. This spray is directed against San José scale, brown rot and leaf curl.

(2) Spray with self-boiled lime sulphur and arsenate of lead when the young peaches are shedding their husks or are about the size of the end of the thumb; in case of plums, shortly after the fruit has set. This spray is directed against the curculio and brown rot. Repeat this spray in about ten days or two weeks and again in about a month before the fruit ripens, leaving out the arsenate of lead in the last spray. In seasons in which the brown rot is bad it may be necessary to give a few intermediate sprays.

The commercial lime sulphur should not be confused with the self-boiled lime sulphur. The commercial lime sulphur should not be used on the stone fruits while they are in foliage. The commercial, or concentrated lime sulphur can be bought ready-made; the self-boiled cannot. If the concentrated product is to be used on a large scale it can be more economically made at home.

FORMULA FOR CONCENTRATED LIME-SULPHUR.

Rock lime.....	50 pounds.
Sulphur.....	100 pounds.
Water.....	50 gallons.

Slake the lime in a kettle in which the cooking is to be done, and when the slaking process is well under way add the sulphur and stir thoroughly. Add enough water to make a thin paste until the sulphur is dissolved; boil one hour. After boiling, the concentrate may be put away in barrels. The barrels should be full and corked tightly. Prepared this way, one gallon of the concentrate should be diluted with 7 or 8 gallons of water, depending upon the concentration obtained.

FORMULA FOR SELF-BOILED LIME SULPHUR.

Sulphur.....	8 pounds.
Rock lime.....	8 pounds.
Water.....	50 gallons.

Add enough water to start the lime slaking then sift over the sulphur. Keep stirring it vigorously until it becomes a thin paste. Let it boil only a few minutes and then dilute to 50 gallons of water. Strain into spray barrel and use immediately. If an insecticide is wanted, add 2 pounds of arsenate of lead paste or one pound of powdered arsenate of lead.

Textbook References:—Nolan, pp. 217–220, 259–262; Davis, pp. 214–220, 223–236; Burkett, Stevens and Hill, pp. 130–133, 141–142, 152–157.

Teachers' Reading.—Farmers' Bulletins 243, 440, and 492; Maryland Agricultural Experiment Station Bulletins 92, 144, and 159.

Practical Exercises.—(1) Require the members of the class to submit written reports on the following topics as observed at their homes: (a) The kinds of spraying equipment used, (b) the sprays

used and their composition, (c) a list of the insects and plant diseases attacking fruits. (2) If possible, take the pupils to a nearby orchard where trees are being sprayed. Have the pupils take notes on (a) the purpose of the spraying process, (b) the equipment used, and (c) the sprays employed. If possible, secure the coöperation of the owner of the orchard and the county demonstration agent when such visits are made.

Correlations.—Written work is provided in the practical exercises.

Arithmetic: Find the cost of the spraying materials referred to in the foregoing lesson.

LESSON FOUR.

Subject: POULTRY.

Topic: Incubation.

The Hen.—By natural incubation is meant the use of a hen as the source of heat for hatching eggs. About the most important thing in connection with natural incubation is the selection of a good hen. There is no use trying to set Leghorns especially if they have to be moved before setting, and often the large hens are so fat, clumsy and lazy that they do not do well. It is hard to describe a hen well adapted to the purpose of incubation. You simply have to feel that a hen will make a good sitter and mother. She should be healthy, bent on sitting, and light enough on her feet so she will not break up the eggs or crush the chicks.

Care of the Hen.—She should be kept free from lice for two reasons. First, she will not sit well if bothered by lice, and second, she will give lice to the young chicks after they have hatched. If she is thoroughly dusted with lice powder two or three times about a week apart the lice will be killed. Dusting only once will not do for the eggs or nits will hatch later and make a new brood.

The Nest.—It is very important that a sitting hen have a good nest (fig. 1) in a quiet place. It should be roomy enough (fig. 2) for the hen to be comfortable. The nesting material should be clean and of some soft material, and not made so deep that the eggs will pile up, nor so flat that they will roll apart. If the hen is set in a box it should be so fixed that she will not

have to jump down on the eggs when entering the nest. A good way to make a nest is to place a barrel upon its side, put a big piece of sod or earth in the bottom and make the nest on top of this, being sure that there are no corners left for the eggs to roll into.

Water and Feed should be kept near the hen. Corn and wheat or corn alone is sufficient for her as she does not need egg-producing feed. Provision should be made for her to come off to exercise for if she does not she will soil the eggs and often become lame and out of condition herself. A sitting hen shut up in a small box or yard should be let out once each day.



FIG. 1. IMPROPER NEST. SITTING HEN ANNOYED BY LAYING HEN.

The Number of Eggs that can be put under one hen varies greatly. A large hen naturally can cover more than a smaller one. A hen can keep more eggs warm in warm weather than in cold. She can cover more small eggs than large ones. It is better to put too few rather than too many under one hen. When too many are put under not only the extra eggs but the whole number will suffer. Thirteen is a good average number in cold weather and fifteen in warm weather. When very valuable eggs are being hatched possibly as few as nine or ten may be all you wish to trust to one hen.

Trying the Hen.—Before putting the eggs in the nest try out the hen on some China or dummy eggs to see if she intends to sit. This is especially desirable if the hen has been moved to a new place. The best time to move a broody hen is after dark. Nine out of every ten hens can be successfully moved if properly done. If you try to move them in the day time many will be broken up.



FIG. 2. INTERIOR OF SITTING ROOM SHOWING PROPER KIND OF NESTS.

Testing the Eggs.—The eggs should be tested on the seventh day to see if any are infertile or dead. This can be readily done with a simple egg tester (fig. 3) and a lamp at night. There is no use for a hen to try to cover infertile or dead eggs. When hatching time comes the nest will not be so crowded if the bad eggs have been removed.

If any of the eggs become soiled or dirty through eggs being broken in the nest or otherwise, wash them with warm water as

soon as possible. Eggs the pores of which are clogged with dirt cannot hatch well.

Advantages of Natural Incubation.—(1) The hen can beat any brooder, (2) less work in small flocks, (3) cheaper with small numbers, (4) resulting stock as a rule stronger, (5) more certainty of results with the inexperienced, as much of the responsibility is turned over to the hen.

Artificial Incubation: The Incubator.—In hatching chicks with an incubator only a good reliable incubator should be used. Do not try to get along with some of the cheap boxes which are called incubators and sold mainly to get your money. A good incubator should be well made, should have a double wall to keep in the heat, a good regulating device and a proper means of taking care of the moisture and ventilating problems.

Locating the Incubator.—The incubator should be placed in a room which has a good even temperature. If the temperature goes way up during the day and way down during the night you will have a lot of trouble regulating the incubator. A cool, clean cellar makes a nice place for an incubator. Being below ground it cannot get very hot during the day nor cold at night. Some difference is made in insurance premium when oil incubators are used. An extra rate is charged even on approved incubators, but on incubators not approved a very high rate is charged. For this reason it is often desirable to operate the incubator in some outbuilding if one is available.

Regulating the Incubator.—Most beginners at operating an incubator are too anxious to get the eggs in. The incubator should be run empty at least two days or until its regulation and operation is thoroughly understood. Do not think you have more intelligence than the average person and can regulate the incubator with the eggs in it for you will fail nearly every time.

Follow the directions of the man who made the incubator until you know more about it than he does. If you have confidence that he knows how to make an incubator you should also have confidence that he knows how to operate it.

The Lamp must be filled once daily for it does not hold enough oil to run two days. The wick should be trimmed at the same time the lamp is filled. If this work is done in the morning you will have all day to get the flame regulated.

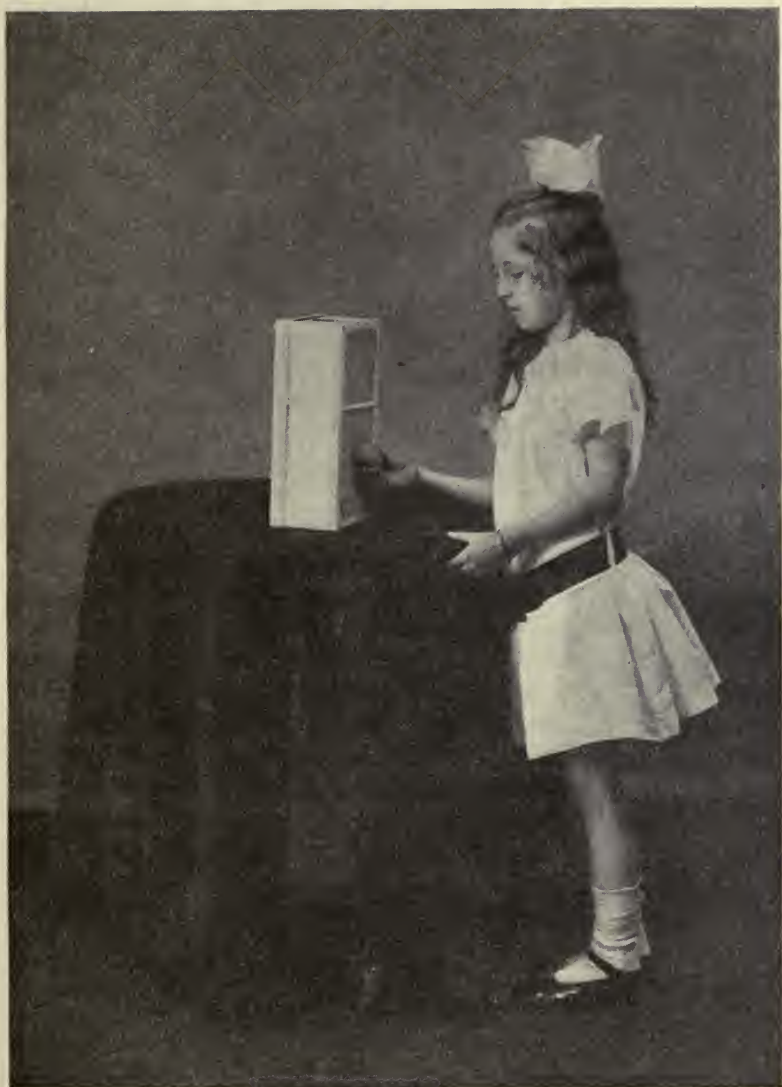


FIG. 3. A SIMPLE EGG TESTER.

Be careful of smoky lamps. An incubator lamp should not be allowed to smoke, but it will if you do not use care. If good oil is used, if the flame is not too high, if the lamp is put in straight, and if the wick has been trimmed properly, little trouble with smoking should occur. Another thing that sometimes causes smoke is turning the wick up or down when there is a crust or deposit on top of it. If it has been some time since the wick has been trimmed you should trim it again before adjusting the wick. Do not use scissors for trimming. Instead use a piece of metal



FIG. 4. A GOOD HATCH.

like a broken thermometer and scrape the charred part off, being sure that all pieces are removed from the burner and everything is left clean.

The Eggs should be turned twice daily, beginning on the morning of the third day. Turn them as nearly twelve hours apart as possible and always turn them before tending the lamp as oil from the hand on hatching eggs very quickly kills them. It is not necessary to turn each egg over but simply mixing them up and gently rolling them around is sufficient.

The old hen puts a very thin film of oil on the eggs when she sits on them which keeps them from evaporating too much. The incubator cannot do this, hence the moisture problem is important in artificial incubation. Some incubators have moisture appliances but most operators supply moisture whether these are present or not. This is done by sprinkling the eggs or incubator with warm water or putting in wet sponges. If moisture is supplied it should be supplied during the whole period of the hatch. Moisture together with carbon dioxide helps to decompose the shells so the chicks can get out.

Testing the Eggs.—The eggs should be tested the seventh day to remove the infertile eggs and dead germs, and again the fourteenth day to take out any others that die later. After the eighteenth day the incubator should be closed and the chicks allowed to hatch. The eggs do not need to be turned after this time.

Care of the Chicks.—When the chicks begin to hatch (fig. 4) cover the glass door in front with a piece of cloth so they will not tire themselves out working towards the light. They should be kept quiet until they gain their strength. Do not be in too big a hurry to get them out. They will do better in the incubator for a time.

Advantages of Artificial Incubation.—(1) Necessary where large numbers are kept, (2) less danger from certain diseases, like gapes, also from lice, etc., (3) less cost of feed, (4) less work where large numbers are raised, and (5) chicks can be hatched any season of the year.

Teachers' Reading.—Farmers' Bulletin 585.

Practical Exercises.—(1) Each member of the class who is not a member of the poultry club should assume the care of one or more sitting hens. Arranging the nest, setting the hen, caring for, feeding and watering the hens, or regulating the incubator, attending the lamp, caring for and testing the eggs furnish interesting practical exercises for this month. (2) Poultry club members should set their hens or start the incubators. They should observe the instructions given in the foregoing lesson. (3) Require the members of the class having incubators at their homes to report the following facts: (a) The capacity of each incubator, (b) the number of infertile eggs discarded when tested, (c) the number of chicks hatched. (4) The teacher and class should

visit a farm where an incubator is being conducted and secure the foregoing facts.

Correlations.—Language: Written work is provided by the reports called for in Exercise 3.

Arithmetic: From the facts reported in Exercise 3 develop problems. What fractional part or per cent of the eggs was infertile? What part or per cent of the fertile eggs hatched? What part or per cent of the whole number of eggs hatched?

LESSON FIVE.

Subject: FARM ANIMALS.

Topic: Sow and Pig Management.

Care and Feed of the Sow.—Many farmers have their sows farrow during the months of March and April. Since the weather is often severe during these months care should be taken to protect the sow from cold. Give her enough straw to make a warm bed but not so much as to allow the little pigs to get covered and crushed. The sow should have clean water but nothing else for the first 24 hours after the pigs arrive.

On the second day a thin bran mash or skim milk will be relished. Feed moderately for the first week. A mixture of two parts of corn and one of middlings may be fed in increasing amounts until the sow is eating a full feed. If skim milk can be had in addition to the grain there is nothing better to make the sow give a full flow of milk. Another good grain mixture for the sow at this time is six parts of corn and one of oil meal. If skim milk is available the sow will do well on four pounds of milk to one of corn. A full grain ration for a day should never be more than 4 per cent of the sow's live weight. If the sow can be put on alfalfa, clover, blue grass or rape pasture, less corn will be required. A corn ration of about 2 per cent of the sow's live weight with good pasture makes a cheap and adequate supply.

Care and Feed of the Young Pigs.—As soon as the little pigs begin to eat they will do best if fed additional slop in a separate pen and away from their mother and the larger pigs. This can be done by having a pen or a lot where choice clover or other forage crop is growing to which the pigs may have access, but where the opening is so small that the larger pigs cannot pass through. When the young pigs are from 8 to 10 weeks old they should be

weaned. This often causes a serious check in their growth which should not be so. When it is desirable to wean the pigs put the mother in a pen leaving a creep for the pigs. Feed the sow sparingly; give water instead of slop and have the grain ration dry. While the sow is receiving a maintenance ration the pigs should be fed all they will consume without waste. A ration consisting of such feeds as skim milk, middlings, corn and green forage will satisfy the pigs' appetites and simplify the weaning.

Textbook References.—Davis, pp. 280-282.

Teachers' Reading.—Farmers' Bulletins 205 and 566; Maryland Agricultural Experiment Station Bulletins 150 and 185.

Practical Exercises.—(1) Pig club members should secure a pig and begin to give it attention. If it is the purpose of the boy to go into the work more extensively, he should now have a sow and litter of pigs to care for. The instructions in the foregoing lesson should be observed. (2) Male members of the class that are not members of the pig club should assume the responsibility of caring for one or more pigs during the year.

Correlations.—Arithmetic: Every item of expense in connection with the project of each pig club member should be kept. These items of cost may be made the basis of problems. In those projects that include a sow and litter of pigs the feed of the sow (until the pigs are weaned) as well as the feed of the pigs should be taken into account.

LESSON SIX.

Subject: GARDENING.

Topics: { (1) Transplanting;
(2) Planting in the Hotbed;
(3) Planting in the Open.

Transplanting: Reasons.—(1) Crops may be started earlier in hotbeds; (2) plants get sufficient growth to enable them to out-strip weeds; (3) a good root system is developed on plants in the hotbed.

Preparing the Seed Bed.—The soil should be thoroughly pulverized so that the small particles of soil can be pressed closely around the rootlets of the plant. This is necessary to enable the young plant to become established in its new home. Many of the root hairs are broken off the plant in removing it from the

hotbed, hence the necessity of having a finely pulverized soil, containing ample moisture to insure the plants a ready and satisfactory growth.

When to Transplant.—(1) The plants should be ready, that is, the plants should be first class. (2) The time when there is danger of frosts should have passed. (3) The soil should be in proper condition—neither too wet nor too dry. (4) Cool, cloudy weather and a damp atmosphere favor transplanting. Just before a rain is always the best time, but the work cannot be done at this time as a general thing.

Hardening off Plants.—If the plants are quite delicate it is often necessary to harden them off before transplanting. This can be done by removing the cover of the hotbed during the day. If the danger of frost is past, the covers may be left off at night. The supply of water should be gradually reduced for some days before the plants are to be removed from the hotbed.

Setting the Plants.—Before taking the plants from the bed it should be watered thoroughly and the water given time to soak into the soil. Take up the plants with a trowel or similar implement. Allow the damp soil to adhere to the roots. Immediately pack the plants in a box or basket in which to carry them to the field. Mark off the rows or dig the holes for the plants just before planting to prevent the drying of the soil. If the soil is very dry it is advisable to use a little water in the hole. Apply the water when the hole is partly filled with soil and cover with dry soil to prevent baking. The plants should be set a little deeper in the garden or field than they were in the plant bed. Pack the soil thoroughly around the roots.

Planting in the Hotbed.—It is now time to sow in the hotbed seeds of the more delicate plants, such as tomatoes, egg plants, and peppers. Sweet potatoes should be bedded the latter part of this month.

Planting in the Open.—Turnips, carrots, beets, potatoes, onions and celery may be planted this month in all parts of the State except possibly the mountain section. Hardy plants started in the hotbed in February should be ready to transplant sometime this month.

Textbook References.—Burkett, Stevens and Hill, pp. 94, 95, 96, 97, 99, 100, 103, 104, and 105; Buffum and Deaver, pp. 57-60; Davis, pp. 174-177.

Teachers' Reading.—Farmers' Bulletins 255, 433, and 647; Maryland Agricultural Experiment Station Bulletins 126, 133, 172, 173, and 180.

Practical Exercises.—(1) Tomato club members should sow tomato seed in the hotbed this month. If more convenient, a large box may be substituted for the ordinary hotbed. The box can be kept indoors when the weather is very bad and placed in the open when the weather is favorable. (2) Each member of the class that is not a member of one of the regular clubs should be encouraged to grow at least a small plat of vegetables in the home or school garden.

Correlations.—Drawing: Have the pupils make sketches of plants that are ready to transplant. Among these are cabbage and lettuce.

Arithmetic: How many bushels of potatoes are necessary to plant an acre? If ten bushels are required to plant an acre find the cost at the market price.

A potato weighing 3 ounces when cut in half and planted one piece in a place gives good results as to yield. If the distance between the rows is 3 feet and the distance between plants is 12 inches, how many bushels (60 pounds per bushel) of 3-ounce potatoes cut in halves are necessary to plant an acre?

LESSON SEVEN.

Subject: INSECTS.

Topics: { (1) Classification;
(2) Growth and Change;
(3) Life Stages;
(4) Some Insect Enemies of Man.

It has been estimated that insects cause a loss of \$1,000,000,000 each year to the farmers of the United States. In addition to this financial loss insects injure the health of and cause considerable loss of life to both men and animals. The consideration of these facts suggests the importance of studying insects.

Classification.—One of the most important classifications of insects from the farmer's point of view is based on their methods of attacking plants and animals; namely, by biting, such as grasshoppers and beetles, and by sucking, such as mosquitoes, bedbugs, bees and butterflies. The former consume the entire substance

on which they feed as bark, leaves, fruit or flowers, and may be killed by the application of some poisonous material to the plants on which they feed. The sucking insects live upon the sap of plants or the blood of animals. As they get their food from the inside of plants they cannot be killed by poisoning their food, hence the necessity of using poisons that destroy the insects by coming in contact with their bodies. Insects breathe through the pores of their bodies and if these are closed by oils or powder the insects soon die.

Growth and Change.—The outside coat of insects becomes hard so that when a growing insect has become sufficiently large to entirely fill this coat a new soft one is formed underneath and the old one is shed. The process of shedding the coat is called moulting. The coat may be shed several times during the life of the insect. As insects have no bones, the outside skin or coat is really a skeleton.

Some insects make very little change during the last two moults. This is true of some bugs and grasshoppers. Others make a great change in structure and outward appearance at the times of the last two moults. Such change is seen in wasps, bees, butterflies, moths, beetles, flies and mosquitoes.

Life Stages.—Insects with complete changes are said to have four stages (fig. 5), in their lives: namely, (1) egg stage, (2) larval stage, (3) pupal stage, and (4) adult stage. The *egg* is deposited by the adult and from it the larva develops. The larval stage is the period of growth. It is during this period of the insect's life that most of the feeding is done. With some insects enough food is consumed during the larval stage to last them through the other stages of life. In the pupal stage no food is taken in, and in this respect it is a resting stage but profound changes are taking place beneath the skin. The larva usually encloses itself in some kind of case. The cocoon is a familiar instance of such a case. Wings and real legs are grown, compound eyes are developed, often a different mouth is formed, and antennae or feelers are grown upon the head. The pupal stage may last from a few days to an entire fall and winter. The *adult* comes out of the pupa case with a new set of organs. It does not look like the larva, yet it is the same fellow. The larvae of many insects are known by special names. Larvae of butterflies and moths are called caterpillars; the *maggot* is the larva of the fly;

wrigglers are the larvae of mosquitoes; *nymph* is the name given to the larval stage of a dragon fly or a grasshopper.

Some of Man's Insect Enemies.—*Mosquitoes* are not only troublesome, but they are carriers of malaria. In fact this dis-



FIG. 5. LIFE STAGES OF THE BEE.

ease can be carried only by means of mosquitoes. *Flies* lay eggs in moist refuse such as manure, garbage and slop. In such places they go through the several stages and develop into the adult fly. Germs of diseases such as typhoid fever are carried on the feet

and mouth parts of house flies. They visit filthy places and carry germs to the kitchens and dining rooms. There are two good remedies that are easy to apply: (1) Clean up places where flies breed, and (2) screen the houses. *Potato beetles* attack potatoes, and unless successfully combated they do great damage to the crop. Paris green and arsenate of lead are mixed with water or Bordeaux mixture and sprayed on the vines. The *codling moth* or *apple worm* does great damage to the apple crop of the country. The adult lays eggs on apple leaves about the time the flower petals fall. The larva eats its way into the fruit and feeds about the center. The *curculio* of plums and peaches makes stone-fruits wormy. When fruits such as plums, peaches, cherries and the like are very small the adult beetle cuts a crescent-shaped opening in the skin of the fruit and lays an egg within the crescent. A grub-like larva hatches and eats its way to the seed. This attack causes the fruit to fall to the ground prematurely. The *peach tree borer* does a great deal of damage to peach and plum trees. The adult is a wasp-like moth. It lays eggs during the summer usually on the bark of the tree near the ground. The egg hatches into a small grub or borer and begins eating under the bark of the trunk. Exuding gum may indicate the presence of the borer. The principal method of destroying borers is to remove the earth around trees for a few inches below the level of the ground. After a few days dig for the borers with a knife or wire. The *San José scale* is probably the worst enemy of tender fruit tree branches. This insect multiplies rapidly during the summer months, hence the necessity of spraying before warm weather comes.

Textbook References.—Davis, pp. 202–207; Buffum and Deaver, pp. 229–236; Nolan, pp. 24–26, 27, 32, 33, 34; Burkett, Stevens and Hill, pp. 144–152.

Teachers' Reading.—Farmers' Bulletins 444, 450, 447, 478, 547, 637, 640, 657, 658, 659, 662; Maryland Agricultural Experiment Station Bulletins 134, 142, 143, 161, 175, and 176.

Practical Exercises.—Gather cocoons, also pupae found in webs on tree trunks. Place all these in bottles with cloth covered tops and watch for developments. See Farmers' Bulletin 606.

Correlations.—Language and Drawing: Describe and make sketches of cocoons; insects in other forms.

Arithmetic: A female fly that may survive the winter can lay

four batches of 120 eggs each. Sixty eggs of each batch produce female flies. Each of these in turn lays four batches of 120 eggs each. Sixty female flies are produced from each hatch. Reproduction continues at this rate through twelve generations in a season. Find the number of flies in the twelfth generation.

This number is produced from one female fly that survived the winter. Swat the fly!

LESSON EIGHT.

Subject: PLANT DISEASES.

Topics: { (1) Types of Diseases;
(2) Prevention;
(3) Some Common Diseases.

Types of Diseases.—There are many kinds of diseases that attack plants grown in fields, gardens and orchards. There are three general types; namely, (1) those produced by fungus or small plant growths, such as rust and smut; (2) diseases produced by minute germs or bacteria such as pear blight; and (3) diseases of plants due to poor drainage, poor soil or unfavorable climate. The last named are not contagious.

Prevention.—The spores from which diseases develop may be destroyed by certain spray materials. These spores should be killed before they get into the leaves or tender parts of plants. This should be done by the application of spray materials just strong enough to destroy the spores and not too strong to injure the plants or parts of plants. The principal fungicide used in preventing plant diseases is Bordeaux mixture. It consists of 5 pounds copper sulphate (bluestone), 5 pounds unslaked lime and 50 gallons of water. Dissolve the copper sulphate in water at the rate of one pound to the gallon. Slake the lime until it is of a creamy consistency and then add water at the rate of one gallon to each pound of lime. These stock solutions should be kept until needed, then dilute each as much as necessary and pour the two solutions at the same time in a barrel or tub. Use the mixture immediately.

The lime-sulphur wash is used both to prevent disease and to destroy insects. The concentrated solution consists of 30 pounds of sulphur, 15 pounds of lime and 15 gallons of water. Wet the sulphur and slake the lime. Add these to 15 gallons of boiling

water and boil until dissolved. Keep this in a closed vessel until ready for use. Dilute with nine times its volume of water to make the spray.

Some Common Diseases.—*Brown rot* of peaches causes the fruit to decay and the twigs to blight. Peaches, plums and cherries are attacked by this disease. Spraying for San José scale helps to prevent the disease. *Peach leaf curl* causes the leaves to become thickened, curled and distorted. The leaves turn brown and fall off. Spraying with Bordeaux mixture or spraying for scale insects usually keeps the leaf curl in control. *Apple scale* attacks both leaves and fruit. The disease appears at blossoming time and soon causes large numbers of the small fruit to drop from the tree. The fruit that remains becomes rough, irregular and blotched. The disease produces sooty spots on the under surface of the leaves. Later the leaves turn yellow and fall to the ground. Spraying in early spring with lime sulphur mixture prevents the disease. *Potato scab* produces scabby looking areas on the surface of potatoes. These scabby areas may deepen into pits or considerable depressions if the disease is very severe. To prevent the disease treat seed potatoes in a solution of formalin consisting of one pint of formaldehyde and 32 gallons of water. The potatoes should be soaked for two hours in such a solution. Do not plant potatoes on ground where scabby potatoes have recently been grown. *Grain smut* appears as a black powder on grain when it is in the head. Oats, wheat and barley are often injured by this disease. The disease may be prevented by soaking the seed in a formalin solution. Mix in a barrel one-half pint of formaldehyde and 20 gallons of water. Place the seed in a sack and lower it into the solution for several minutes. Then scatter and dry the seed.

Textbook References.—Davis, pp. 224–232; Burkett, Stevens and Hill, pp. 129–142; Nolan, pp. 42–44; Buffum and Deaver, pp. 198–202.

Teachers' Reading.—Farmers' Bulletins 127, 243, 440, 492, 507, and 544; Maryland Agricultural Experiment Station Bulletins 143 and 164.

Practical Exercises.—Have the members of the class bring to school specimens of potatoes affected by scab, and if convenient apples affected by scab. Possibly some peach mummies may still be found in some orchards. These were mummified as a result

of brown rot. These should all be studied in the class to enable the pupils to recognize the diseases and to see the damage done to the plant products.

Correlations.—Drawing: Make sketches of potatoes and apples showing the scab. Outline a mummified peach.

Arithmetic: Based on local prices of materials find the cost of the sprays mentioned in the foregoing lesson.

LESSON NINE.

Subject: MANAGEMENT SUGGESTIONS.

Soil.—Continue plowing. Harrow and reharrow all plowed land until a perfect seed bed is secured. An ounce of preparation is worth a pound of cultivation. Apply lime to corn land as the seed bed is being prepared. Where grass lands have not had a sufficient amount of stable manure applied previously there should now be an application of commercial fertilizers. As the grass becomes green is the proper time to make the application.

Go over your drainage systems and see that they are working properly. Often earth from the sides is thrown into the bottom of open ditches by the freezing and thawing of winter. This may so choke up the ditch so as to interfere with the outflow of water, or the earthslide may cause the flow to cut into and undermine the opposite bank. Where there is underdrainage see that the outlets are open. Examine the fields of winter wheat, rye and other winter grains and see if the crop has been killed, injured in spots by "heaving" or "spewing," or has been drowned out by water standing on the surface during the winter. If any such spots are found plan to give them better drainage.

The time will soon come for turning stock on pasture. Trouble may be saved if the fences are gone over at this time and loose wires tightened up and defective posts or rails replaced.

Continue hauling manure on fields intended for corn. Fresh manure spread on the top of plowed land and worked in with the harrow will give better results than if spread before plowing at this season unless the manure be very coarse.

The too common practice of burning over old fields at this season preparatory to plowing is strongly to be reprobated. It is much better practice to go over such fields with the disk harrow once or twice to chop up the dry vegetable matter and mix

it with the soil and then plow, rather than to burn the vegetable matter, which is the life of the soil.

Crops.—Continue sowing red clover seed. Begin to make plans for planting alfalfa in late summer and early fall. Continue sowing oats in Southern Maryland and on the Eastern Shore.

Horticulture.—Continue pruning and take up the work of spraying. Do not put off spraying until insects and plant diseases appear. Preventive spraying is more effective than spraying to check or destroy insects and diseases. Lime sulphur not only destroys the scale insects but rids the plants of fungous or germ diseases. Bordeaux mixture is a splendid preventive treatment for plant diseases. Arsenate of lead is effective in connection with the principal insects that attack plants.

The garden work should be pushed along. In those sections of the State where the growing of potatoes is an important phase of farming the seed should be secured, treated with formalin solution and planted. Some planting in the open may be done this month in all parts of the State except in the mountain section.

Farm Animals.—Make preparations for the coming of new litters of pigs. Fix the farrowing pen and provide bedding. When the young pigs arrive see that the sow receives proper food, water and attention. The success of the pigs depends very much on the attention the sow and pigs receive during the first few weeks. Grazing is an important element in the ration and is an inexpensive feed. This should have been previously provided for.

This is an important month with those interested in poultry. Natural and artificial incubation is in progress. Much of the year's success depends upon the results obtained this month and next. See that sitting hens are comfortable and properly cared for and the incubator is kept in proper condition for satisfactory incubation. The inexperienced operators of incubators should follow instructions closely. Large hatchings of thrifty chickens are the results desired. Failures are expensive both in eggs and time.

All draft horses should be well fed and kept in thrifty condition. The work of the farm is becoming heavy and the work animals should be in condition to render good service. Feed the dairy cows well. Do not let them drop off in the milk flow.

Pastures will soon be ready and then it will be time enough to consider a let up in the feed.

Plans, Improvements and Repairs.—Keep up with the book-keeping. Get the habit of keeping accurate records. Begin whitewashing the farm buildings. Use lime liberally about the premises. Every precaution should be taken to prevent vermin getting a start about poultry yards and houses. Be prepared to meet an epidemic of hog cholera. Keep in touch with the Maryland Agricultural College so that in the event of an outbreak of cholera in the community inoculating material may be had promptly.

APRIL.

Introduction.

As spring advances the teachers should take advantage of the open weather to go on excursions with the pupils to make field observations in connection with the work in agriculture. If each trip is made with a definite purpose, and the pupils are required to take notes on the things observed, the lessons in the class may be greatly reinforced.

Each teacher should encourage the members of the class in agriculture to take up some club project. Information with reference to club work may be had from the Maryland Agricultural College and the U. S. Department of Agriculture.

LESSON ONE.

Subject: GARDENING.

Topics: { (1) The Cold Frame;
(2) Planting in Cold Frames;
(3) Planting in the Open.

Cold Frame: Importance.—Many of the less hardy plants that are started in the hotbed must be transferred to the cold frame before it is safe to set them in the open. Plants that can be grown in the open at certain seasons may be grown in cold frames either for market or home use when the weather conditions are unfavorable. This is true of such plants as lettuce and radishes. The principal use of the cold frame in the early spring is to harden off tender plants before setting them in the open.

Location.—Cold frames should be protected from the north and west winds. The south side of a building, hedge or fence makes a suitable place. It is necessary to use considerable water with the growing plants, hence the water supply should be convenient. If the ground is uneven or sloping it should be carefully graded before placing the frames.

The Frame.—Cold frames (see illustration of hotbed in Lesson Six, February) are less expensive to make than hotbeds. Exca-

vation is not necessary, heating material is not needed and the frame itself requires less material. The size of the plants to be grown determines the height of the frame. Ordinarily a 12-inch board on the north side and a 6-inch board on the south side are high enough. Tomatoes usually require 16-inch and 10-inch boards on the north and south sides, respectively. Frames usually are made to accommodate two or four 3 by 6-foot sashes. In cold weather the outside of the frame should be banked with soil or sod.

The soil in the frame should be thoroughly pulverized and enriched as for any other intensive garden work. The richer the soil, the better the results.

Planting in the Cold Frame.—The very tender plants such as tomatoes, egg-plants, and peppers that were started last month in the hotbed should be transferred to the cold frame. Here they must be carefully attended to so that when they have attained a good growth they may be hardened off and when the danger of frost is past they may be set in the open.

Planting in the Open.—In most parts of the State cabbage should be set out this month. Peas and sugar corn should be planted. In the southern parts of the State beans, beets and other more delicate vegetables should be planted. Bush beans should be planted to stand 3 or 4 inches apart in rows and 30 inches apart where horse cultivation is to be used. Lima beans should have the same distance between the rows but the plants should stand 5 and 6 inches apart in the row. Pole beans should stand 3 to 4 plants in a hill and there should be a distance of 3 to 5 feet between the hills. The bean seed should be covered to a depth of $1\frac{1}{2}$ to 2 inches, depending on the heaviness of the soil.

Beets should be planted in drills 18 to 24 inches apart and about $\frac{3}{4}$ to 1 inch deep. The seed should be sown moderately thick, but as soon as the plants are well up thin them to a stand 3 or 4 inches apart. The instructions with reference to planting beans and beets apply in cases of vegetables with similar seeds and growing habits.

Textbook References.—Burkett, Stevens and Hill, pp. 93-96; Buffum and Deaver, pp. 154-156; Nolan, pp. 238-244; Davis, pp. 175, 176.

Teachers' Reading.—Farmers' Bulletins 255, 289, 433, 460 and 647.

Practical Exercises.—(1) Require the members of the class to report in writing as to the cold frames used at their homes. Cover such points as the dimensions, the number of plants that may be grown at one time and the kinds of plants usually grown or hardened off in the cold frames. (2) Tomato club members should transfer their plants from hotbeds or germinating boxes to cold frames. Exercise the same care in making such a transfer as in transplanting. Also prepare the soil for the setting of plants later.

Correlations.—Have each pupil submit a drawing of the cold frame used at home. This should be submitted in connection with the written report.

Arithmetic: Find the areas of the cold frames reported in Exercise 1. If each plant in the cold frame occupies a space 3 inches square, how many plants may be accommodated by the several frames. Find the cost of the materials used in constructing the several frames reported.

Geography: Is the sun directly overhead at noon or is it somewhat to the south? Do the sun's rays fall vertically upon the earth's surface at any time during the day at this season? A greater number of rays of light strike a certain surface if they fall vertically upon it. Give a reason for the cold frame sashes sloping toward the south.

LESSON TWO.

Subject: SMALL FRUIT.

Topic: Grapes.

Planting.—Attention to this phase of the subject was given in the November number, but it may be convenient to plant at this time, hence the suggestions in this connection. If cuttings are used in planting, two should be set in a place to insure a stand. If both cuttings grow one of them can be easily removed. To prevent the cuttings drying out, plant them so that the top bud is slightly above the ground. If rooted vines, either grafts or cuttings are used, the roots should be cut back to 3 or 4 inches in length. Only one cane of the top should be left. This cane should be cut back so as to contain only two or three good buds. In case of grafts, remove all suckers and scion roots. No pruning is necessary the first year.



FIG. 1. ONE YEAR'S GROWTH—READY TO PRUNE.

First Pruning.—The first pruning after planting may be done any time during the dormant period of the plant. It is now too late for such pruning. During the spring and summer, however, all extra young shoots should be removed. The one cane that is to become the main vine should receive the full force of the plant. The shoot (fig. 1) left to grow must be kept carefully tied to the stake to cause it to grow erect and to protect it from being broken by the wind. When the main shoot has grown a foot above the point where it is to head it should be topped at the point where the head is to be. The laterals that are desired should be permitted to grow. All other shoots should be removed.

The Trellis.—Where there is room for only a few vines, they are often trained on porches, fences, outbuildings, trees or arbors. The arbor furnishes a shady bower or a covered walk as well as fruit. For the trellis (fig. 2) good posts of cedar, locust or other durable wood should be used. They should be long enough to stand about 6 feet high when set. A post should be set between each two plants. The end posts should be heavier than the others and should be thoroughly braced with post and cross wire. Number 11 galvanized wire makes a good size for general use.

Black Rot.—This is a fungous disease spotting the leaves and rotting the fruit and doing immense damage in some seasons. It is most prevalent in moist warm climates.

Treatment: After growth has started spray five or six times with Bordeaux mixture at intervals of two weeks. Use the 4-3-50 formula. If desired for the last spraying to prevent discoloring the fruit, neutral copper acetate, one pound to 50 gallons of water, may be used. Bagging bunches with 4-pound manila paper bags just after blossoming is almost a complete protection from black rot on the fruit. This is also a protection from birds and bees.

Downy Mildew.—This disease appears as downy white spots on the leaves, also attacks the fruit. Some varieties are more susceptible to the mildew than others. Niagara seems to be more injured than other commercial varieties grown in Maryland.

Treatment: The treatment recommended for the black rot will answer for this also.

Leaf Hoppers.—This insect causes considerable damage to the foliage, lessening the vigor of the plant and preventing the proper development of fruit.



FIG. 2. MODIFIED MUNSON SYSTEM OF TRAINING: A, UNPRUNED;
B, PRUNED.

Treatment: As the mature insect winters over in fence rows or where leaves or other material are allowed to collect, the burning of such rubbish in the fall is a good preventive measure. Most of the damage done is done by the young nymphs and spraying with "Black Leaf 40" 1 part to 1600 parts of water or Bordeaux, should be done during the latter part of May.

Flea Beetle.—There has been much complaint the last year or two of injury from this insect, which feeds on the flower clusters, often ruining the entire crop. This is a small, steel blue insect, which hops away when approached.

Treatment: Upon the appearance of the pest spray with a solution consisting of 4 pounds arsenate of lead, 1 gallon glucose or molasses and 50 gallons of water.

Teachers' Reading.—Farmers' Bulletin 471; Maryland Agricultural Experiment Station Bulletin 182.

Practical Exercises.—(1) The cuttings that were started on the school grounds should be set in a permanent place. Remove all canes but one and carefully tie it to a firmly set stake. (2) If practicable the teacher and members of the class should visit a farm where grapes are grown to some extent and observe the practice in handling young vines. Otherwise have each member of the class report in writing the methods followed at home. In either case answer the following questions: How far apart are the plants set? Are grafts or rooted cuttings being planted? List the varieties. What kind of stakes are used for supporting the plants?

Correlations.—Geography: California, New York, and Michigan are the great grape-growing States in the Union. Compare these States as to latitude, longitude, climatic conditions, population and other agricultural industries. Compare them with other grape-producing countries such as France and Italy.

LESSON THREE.

Subject: SMALL FRUITS.

Topic: Strawberries.

The Soil.—The strawberry is cosmopolitan in its relation to soil. Any soil that will grow crops of corn or vegetables can be made to grow good strawberries. Strawberries require an abundance of plant food and moisture. A soil fitted for strawberries

should be in excellent tilth, and well supplied with humus. This can be supplied advantageously through cover crops of cowpeas, crimson clover, or stable manure. If a cover crop is turned under and followed by some hoed crop, the land will receive a good preliminary treatment for strawberries.

Previous Treatment of the Soil.—Stable manure may be applied in the winter months and plowed under early in the spring. It should be well distributed through the soil. This will enrich the soil and make it capable of holding large quantities of moisture which the plants can draw upon later. If stable manure is not available, commercial fertilizer may be used. It should be applied after the land has been plowed and harrowed once. If the land is a clay soil, the harrow should follow the plow immediately, or it may be difficult to get the land free from lumps. Sandy soil should be rolled down firmly after harrowing and all soils should be smooth and level before marking the rows.

Planting.—Strawberries for commercial purposes are planted in rows about 4 feet apart and the plants 15 inches apart in the row.

When the plants come from the nursery they should be unpacked, the bundles opened and heeled in. Before taking them out to plant, the roots should be puddled. Before setting the plants, the roots should be cut back about one-third. The foliage should also be reduced, leaving only the youngest or crown leaf. Strawberries should be set in a flat hole such as is made by a flat dibble or spade. The roots should be spread and fan-shaped in this hole, and the dirt firmly pressed against them from both sides. A good time to set them out is right after a rain.

Cultivation should start as soon as the plants are set. It is best to use a fine-toothed cultivator, and cultivate close up to the plants. This breaks up the ground compacted in setting the plants and establishes a dust mulch. The cultivator should be followed with the hoe. This cultivation should be repeated after every rain as soon as the ground is workable.

The conservation of moisture is very important. Treat every rain as if it were the last one expected during the season. Cultivate your strawberries every week if you can and keep it up until quite late in the fall.

Removing the Blossoms.—In two or three weeks after the plants have been set the blossoms will appear. At this time the

field should be gone over and the blossoms, or buds, removed. If this is not done the blossom and resultant fruit will greatly weaken the plant. A newly set strawberry does not start making vigorous growth until the buds have been removed.

Picking and Marketing the Berries.—Just when to pick the berries will depend largely upon when they are to be marketed. If the fruit has to be shipped a long distance, it should be picked before they are fully ripened so that they will not be too soft when they reach the market. For nearby markets they may be allowed to ripen fully but they should still be good and firm. Strawberries should be picked with the stems on. Do not pick them when the vines are wet from dew or rain if it can be avoided. Berries will hold up better and carry longer distance if picked when perfectly dry. Berries picked in the afternoon will generally keep better than those picked in the morning.

The berries should always be put up so that they will present an attractive appearance. One or two good packers will take care of all the berries picked by 40 or 50 pickers. It is only necessary to arrange the top layer of each box. Place the stem ends down and show the most attractive side of the berries. Before the box is packed in this manner the packer should make sure that the berries are just as good at the bottom as they are on top. This can be done by placing the hand lightly over the berries and tipping the box enough so that the bottom can be seen. Unless there is some way of checking up the pickers there will be lots of poor picking. In this way any poor work on the part of the packers will be discovered.

Textbook References.—Davis, pp. 196–198; Buffum and Deaver, pp. 186, 187.

Teachers' Reading.—Farmers' Bulletins 198 and 664; Maryland Agricultural Experiment Station Bulletins 124, 160, and 182.

Practical Exercises.—Have the pupils make observations at home and at the homes of neighbors to be able to answer the following questions:

1. Are strawberries grown for home use or for market?
2. What kind of soil is planted to this crop?
3. What varieties have been grown with best success?
4. What is the practice as to distance between rows and between plants?
5. What diseases or insects give trouble?
6. What preventive measures have been used with success?
7. What area is devoted to strawberries.
8. What is the usual yield per acre?

Correlations.—Written work is provided by answering in writing the foregoing questions.

Arithmetic: Find the total area devoted to strawberries as determined from the reports. Find the total yield of berries. Find the value of the total yield of berries at the average price.

Geography: What is the principal market of the strawberry crop? What advantages has the principal market over other competing points—nearness, railroad facilities, number of consumers?

LESSON FOUR.

Subject: SOILS AND CROPS.

Topics: { (1) Green Manuring;
(2) Sewing Oats.

Green Manuring: Defined.—The turning under of a green crop to supply organic matter to the soil is known as “green manuring.” This should be a part of a fixed system of soil management on every farm where permanent improvement of the soil is intended. The green plants turned under furnish ingredients for immediate use by the succeeding crop, improve the physical condition of the soil by adding vegetable matter, and in the process of decay assist in making available other plant food in the soil.

Crops.—The winter cover crops planted the previous summer or fall may be turned under at this time. Among these crops are rye, barley, oats, wheat, timothy, crimson clover, and vetch. Such crops as cowpeas, soybeans and velvet beans may be planted in the spring and turned under in late summer or early fall.

When and How to Turn Crops.—The crops as a general thing should be turned when they have reached a good growth and are full of sap. In this stage the plants add considerable moisture to the soil and decay rapidly. In turning the land the furrow slice should not be turned over flat. If this is done there will be a continuous layer of vegetable matter between the soil and subsoil. This layer of vegetable matter impedes the passing of moisture from the subsoil upward until the vegetable matter has decayed. The furrow slice should be turned partly over and should rest against its neighbor. In this way the vegetable matter may be thoroughly mixed with the soil and the movement of soil moisture is not interfered with.

Lime and Green Manures.—If the soil is not well supplied with lime either naturally or by recent application, it may be necessary to apply a liberal amount in connection with a heavy succulent crop. When vegetable matter decays in the soil, organic acids are produced. These acids make the soil sour, hence the necessity of using lime. The lime may be applied in connection with a previous or succeeding crop or it may be applied before seeding the crop to be used as green manure.

Oats: Preparation of the Seed Bed.—It matters little what crop has been grown the preceding year the land should be thoroughly prepared. Oats usually do best when sown in a firm seed bed with about 3 inches of loose, mellow soil on the surface. If oats follow a well cultivated crop the land can be prepared by double disking with the disks set to cut 3 or 4 inches. If oats follow grass or clover the land should be turned the previous fall or winter so that it may have time to settle. Double disking just before planting makes a good seed bed.

Treating for Smut.—The yield of grain and the quality of the crop can be considerably increased by treating the seed oats for smut. An easy method is to sprinkle the seed with a solution made of 1 pound or pint of formalin to 40 gallons of water. Spread the seed on a floor, and thoroughly sprinkle and turn with a shovel until all the grain is well moistened. Then cover the seed with sacks or blankets for several hours. Remove the cover, let the seed dry and sow as soon as convenient.

Date of Seeding.—In Southern Maryland oats may be sown in the fall, but in Northern and Western Maryland it is hardly advisable to plant the crop before the last of March or the first of April. In some seasons the crop might be planted earlier, but as a rule it is not safe on account of possible freezes.

Rate of Seeding.—The rate of seeding depends on the locality, the condition and fertility of the soil and the method of seeding. Poor soils require more seed than fertile, weedy land more than clean, broadcast sowing more than drilling. The best practice indicates that from 8 to 12 pecks should be sown on an acre depending on the conditions mentioned.

Methods of Seeding.—The two methods in common use are broadcasting and drilling. The ideal method is one that distributes the seed evenly and to a uniform depth of about one inch.

These results can be secured only by drilling seeds. Seeds that are broadcasted should be covered by shallow double disking.

Textbook References.—Davis, pp. 150–152; pp. 73–76; Buffum and Deaver, pp. 114–117; Burkett, Stevens and Hill, pp. 209–212.

Teachers' Reading.—Farmers' Bulletins 266, 406, and 424.

Practical Exercises.—(1) Require the members of the class to report the crops being turned under this spring at their homes. Make a list of these crops. (2) Have each member of the class report on the following points with reference to oats: The varieties planted, the number of acres planted to each variety, the number of bushels planted per acre, the kinds and amounts of fertilizers used and the use of smut preventive. (3) Collect and mount in small bottles specimens of the several varieties of oats being planted this spring. Label each bottle.

Correlations.—As written work have the pupils copy in their class notebooks the facts learned in Exercises 1 and 2.

Arithmetic: How many acres are being planted to oats as determined from the foregoing reports? How many bushels of seed are being planted? What is the total cost of the oat seed at local prices?

Geography: Illinois, Iowa, Minnesota, Wisconsin, North Dakota, Ohio, Nebraska, Indiana, Michigan, and South Dakota, in the order named lead in the production of oats. Locate these States on the map and compare them with Maryland as to latitude, longitude, area, population and industries.

LESSON FIVE.

Subject: POULTRY.

Topic: Natural Brooding.

The Hen.—As in natural incubation the hen is used as a source of heat in natural brooding. It is just as important, if not more so, to have a good hen for brooding young chicks. As a rule a good sitter is also a good mother, but not always. It is not necessary that the hen hatch the chicks she broods. Oftentimes where several hens are sitting the chicks when hatched may be given to a few of these hens. Chicks hatched in incubators may be brooded under hens.

The Coop.—A good coop (fig. 3) must be provided if the old hens are to do well. By this is not meant an expensive one for often a box or barrel can be fixed up so that it is very serviceable. A barrel laid upon its side and a piece of roofing paper tacked over the end makes a good shelter when placed in a proper place. Some kind of front should be provided so that the old hen cannot get out and lead the chicks through the wet grass early in the morning. Inexpensive coops can be made of boxes. A coop 2



FIG. 3. A GOOD TYPE OF BROODING COOP.

by 3 feet, 1 foot high in the rear, and 2 feet high in the front makes a good one. If a sliding door is put on the front covered with fine wire and the whole coop placed on a platform rats can usually be kept out. The coop should be high enough so that the hen can see out without stooping down, otherwise she may step on some of the chicks and kill them.

Care of the Chicks.—Do not be in too much of a hurry to get

the chicks out of the nest. They should be left until they are quite strong and well dried off. If the chicks have been hatched in an incubator they should be given to the hen before they are more than two or three days old. If too old they will not always go under the hen. Some hens will not take strange chicks, therefore you should put two or three under each hen to try her out before giving her a full brood.

The number that can be safely given a hen varies greatly. The less she has the better she can care for them. Sometimes in

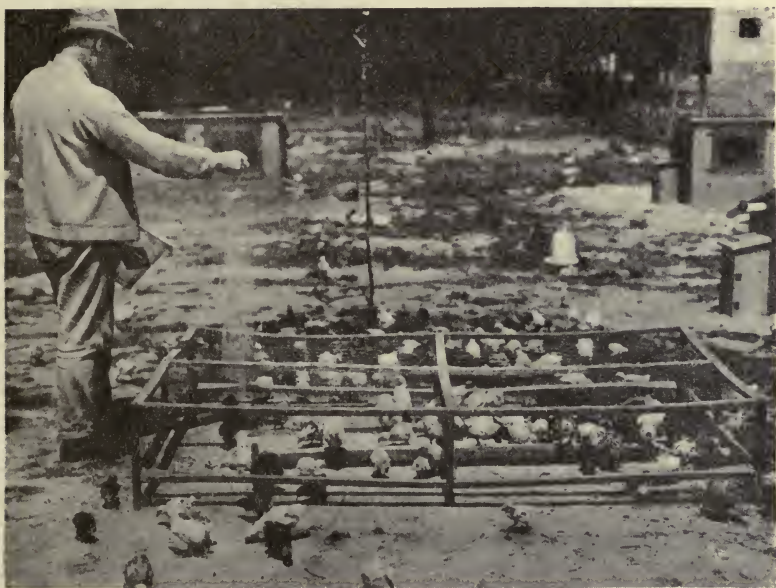


FIG. 4. A COOP FOR FEEDING SMALL CHICKS.

warm weather as many as 30 or 35 can be brooded successfully under a good motherly hen, but between 15 and 20 would be better. In cold weather a hen cannot handle nearly so many as in warm weather.

Feeding.—The chicks (fig. 4) do not require feed the first couple of days. Then they should be fed sparingly. There are many things that can be used, but the following is given for an example of suitable feed for young chicks:

First few feeds: Hard boiled eggs ground in a food chopper and mixed with oatmeal. Next few weeks:

MASH MIXTURE.

Bran (wheat).....	4 parts.
Corn meal or hominy chop.....	2 parts.
Middlings (wheat).....	2 parts.
Meat scrap.....	1 part.
Salt, $\frac{1}{2}$ lb. to each 100 lbs.	

GRAIN MIXTURE.

Finely cracked corn.....	1 part.
Cracked wheat.....	1 part.
Hulled oats.....	1 part.

Use the above two mixtures, the mash fed in shallow troughs twice daily (about 10 a.m. and 4 p.m.) and the grain in a litter of cut straw three times daily (early in morning, noon and late in the evening). At first the mash may be moistened slightly with water, but feed dry as soon as chicks learn to eat it readily. Chopped hard-boiled eggs and oatmeal may be given occasionally as a relish. Regulate the feeds so that the chicks are hungry at each feeding time, but be certain that they are not starved. Little and often is the rule with young chicks until they get to going well.

The Health of the Chicks.—It is very important that lice be kept off the young chicks. If the hen was dusted properly while sitting, there should be no trouble, but if not, the chicks had better be watched. Head lice are the worst. These little animals seem to sap the vitality from a young chick very quickly. If present, grease the heads of the young chicks with a very small amount of vaseline or lard. Do not use too much, as the chicks are rather tender and can be killed easily. Dust the old hen thoroughly but use a mild powder. Some strong powders are rough on the chicks.

Protecting the Chicks.—The young chicks must be carefully protected from all enemies. If cats, dogs, rats, etc., are troublesome you will probably have to make a yard for them and shut them up each night. Plan ahead as to how you will protect the chicks from enemies for it is too late after the brood has been destroyed by some animal.

Teachers' Reading.—Farmers' Bulletins 287, 528, 530, and 624; Maryland Agricultural Experiment Station Bulletin 171.

Practical Exercises.—(1) Require the pupils to report in writing as to the kinds and dimensions of brooding coops used at their homes. (2) Making brooding coops for home use is suitable work for the members of the class and of the poultry club.

Correlations.—Reports required in Exercise 1 provide written work.

Drawing: Make a plan of a brooding coop.

Arithmetic: Develop problems to determine the cost of making the several brooding coops in use at the homes of the pupils.

LESSON SIX.

Subject: POULTRY.

Topic: Artificial Brooding.

The Brooder.—The lamp brooders (fig. 5) burning kerosene oil are most often used, especially with small flocks. They operate much in the same manner as oil incubators and should be handled just as carefully. Most brooders are rated to accommodate from 75 to 100 chicks, but 50 is nearer the proper number. When everything goes well the large number may be handled successfully, but a chilling or other trouble is disastrous with the large flocks.

If the brooder has been used before, it should be thoroughly cleaned and disinfected. Some one of the coal tar dips put out by a reliable firm may be used. Use good clean litter for the floor. In fact everything must be clean and in good order to get the best results. Clean straw cut in short lengths makes a good litter. Clover chaff, cut hay, cut clover, alfalfa meal, and even bran are sometimes used as a litter. The main thing is to have it clean.

The brooder should be thoroughly tested out before the young chicks are put in, as success with the flock will be measured largely by the way you handle them the first few days.

Care of the Chicks.—Be careful not to chill the chicks when removing them from the incubator to the brooder. Use a good large basket and a warmed cloth to cover them. Put them under the hover and watch them carefully until you are sure that they know where to get warm. The old hen can cluck to them

and call them, but the metal hover cannot. The attendant has to take the old hen's place in teaching the chicks where the heat is to be found. As soon as any of the chicks show signs of being chilled place them where it is warm. They will soon learn to take care of themselves. If they are not watched carefully at the outset, they crowd into a corner and injure or kill themselves. This is what the poultrymen call "huddling." After the chicks have once "huddled" they will always pile up when cold. They seem never to forget how they first got warm.



FIG. 5. A GOOD TYPE OF BROODER.

The temperature at which to operate a brooder varies greatly. The best way is to have the hover just warm enough so that the chicks will poke their heads out from under the curtain. The sound made by chicks when cold or uncomfortable is very different from that made when they are happy and contented. The attendant should be able to detect this difference. Feed the chicks the same as directed under natural brooding. See that they get plenty of water and green food. If they are shut up see that they get some material that they can use for making bone.

It is a good plan to keep ground bone before growing chicks. Feed often and sparingly. If the chicks are fed often and are hungry every time they are fed, there is no danger of overfeeding. This feeding often makes it reasonably certain that they are getting at least nearly enough.

Keep the brooder clean. The more chicks there are the more often it should be cleaned. If neglected for as much as a week the chicks soon show it.

Fireless Brooder.—This system of brooding is very successful with some but it requires considerable time. The principle is to confine the chicks within a rather small place and the animal heat from their bodies keeps them warm. A box 18 inches by 18 inches and about 6 inches high will make a fireless brooder. To provide a door, cut a hole in one side and tack a piece of wire gauze over it. Then fit a light frame on top of the box and tack a piece of canton flannel or old quilt over it, letting it hang quite loose. The box should be provided with a wood cover about 4 inches deep. A few inch holes should be bored in two sides of the cover for ventilation.

To operate the brooder fill it well up with fine straw or chaff, being sure the corners are packed full. Make a nest just about the size of a hen's nest in the straw or chaff. It is then ready for the chicks. Not less than 18 or 20 nor more than 30 chicks should be placed in the brooder. Too few will not keep warm and too many will pile up and smother. If the weather is cold, place some cotton or wool over the cloth which rests on the chicks. It takes a lot of time and patience to teach chicks where to get the warmth in a brooder of this kind. For some time the chicks will have to be taken out and put back every time they are fed. This is the greatest difficulty with the brooder. The straw or litter should be changed often and dried out every day as the young chicks give off a great deal of moisture. This type of brooder should be kept indoors except in warm weather. In cold weather, heat must be furnished to the room from some source.

Teachers' Reading.—Farmers' Bulletin 624.

Practical Exercises.—(1) Require the pupils to make written reports on the kinds, dimensions and methods of heating the artificial brooders at their homes. Discuss in class the degree of success met with in the use of each. (2) Making a fireless brooder is suitable work for members of the class and of the poultry clubs.

Correlations.—Written work is provided for in Exercise 1.

Drawing: Make a plan for a fireless brooder. Have each pupil sketch the brooder used at home.

Arithmetic: Develop problems to determine the cost of making a fireless brooder.

LESSON SEVEN.

Subject: SILAGE.

Topic: The Crops.

Corn.—The most generally used and the best crop for silage is corn. Any variety that grows well in the community will do. In planting corn for silage, the seed bed should be prepared the same as for grain. If drilled in rows with a kernel every 8 inches, the maximum yield of silage may be expected, although there will not be as much grain as when the kernels are dropped farther apart. Corn is the logical silage crop because more tons per acre can be grown. Again, the corn stalk has a pithy stem; the pithy stem makes the exclusion of air easy, consequently the silage is not as apt to spoil. Corn contains starchy substances so that the fermentation will be carried far enough to keep the silage in good condition by the production of certain acids.

Sorghum and Kafir Corn.—Both these plants make good silage. They may be drilled or broadcasted. Drilling is the most practicable, as it is difficult to harvest the crop when sown broadcast. Sorghum, although it contains a large amount of sugar, will not ferment so as to render the silage too sour.

Legumes.—Legumes, such as alfalfa, clover, vetch, cow peas, and soybeans have been ensiled with varying success. Bacteria seems to act on the protein before enough acid can be developed to kill the bacteria. This action gives the silage a strong and disagreeable odor. If it seems expedient to use a legume for silage, some plant not so rich in protein should be sown with the legume. Crimson clover and winter oats have been used with success in some localities. Winter vetch with wheat makes a good combination for spring silage. If these combinations are used great care should be taken in packing the silage. Both plants have hollow stems and will carry much air into the silo, which, if not excluded by packing, will cause excessive fermentation.

Dried Stover.—Stover has been used for silage by adding water

enough to take the place of that lost by drying. On most farms this is impracticable owing to the great quantity of water required. The silage is not as good as when placed in the silo at the proper time.

Textbook References.—Davis, p. 311; Buffum and Deaver, pp. 79, 80.

Teachers' Reading.—Farmers' Bulletin 578.

Practical Exercises.—(1) Require the members of the class to collect and compile the following community information: (a) The number of stave silos and the dimensions and the ton capacity of each; (b) the number of concrete silos and the dimensions and ton capacity of each; (c) the number of metal silos and the dimensions and ton capacity of each; (d) the total number of silos and the total ton capacity.

(2) Collect and compile the following information: The number of acres to be planted (a) in corn, (b) in sorghum, and (c) in legumes for silage.

Correlations.—Language: Have the pupils prepare tables similar to the one that follows. These tables may be used in collecting and compiling the silo survey facts.

COMMUNITY SILO SURVEY.

NAME OF OWNER	KIND OF SILO	HEIGHT	DIAMETER	CAPACITY	
				Cubic feet	Tons
John Smith.....	Stave	30 ft.	14 ft.	4320	100
.....
.....
.....

Arithmetic: Find the total ton capacity of the silos in the community. Find the total capacity in cubic feet. How many pounds of silage in each cubic foot? If a dairy cow is fed at the rate of 30 pounds of silage a day, how many cows could be supplied for 5 months by the silos in the community?

Corn producing 50 bushels an acre should make on an average of 10 tons of silage. At the same rate, how many acres of corn would be necessary to fill the silos of the community. Develop similar problems.

LESSON EIGHT.

Subject: SOIL.

Topic: Life in the Soil.

What is your idea of the soil? When you think of it is it with the impression that it is cold, damp and muddy in winter, and hot, dry and dusty in summer? Do you think of it as a lifeless mass of sand, clay, gravel, clods and rocks, or do you think of it as being the home of a multitude of tiny creatures constantly working for you. Listen, no where in all the world are there so many active living beings as are found in the few inches of soil on the earth's surface. Think of the multitude of people, animals, insects, and plants that live on the earth, yet in number they do not compare with the vast multitude of toiling creatures called germs or bacteria that live in the soil.

But doubtless you are already thinking, how do they live, what do they eat and what do they do? During the winter months when the soil is freezing and thawing, and seems so cold, damp and muddy, and the ice crystals and frost are breaking up the gravels, the clods and the rocks into small particles many of our little friends are tucked away in their beds, sleeping like the toads and the insects. But when the warm spring days come and the ice and frost disappear, they wake up and begin working night and day during all the long summer months.

But what do they eat? It's strange, but they like the things that we do not want. Just think, they make the most delightful meals of the old dead leaves, stems and roots of corn, cotton, peas, oats, wheat, tomatoes and other plants. And, would you believe it, while they are eating all this rubbish about the farm, getting it out of the way of the farmer's plow and the little seed to be planted in the soil, they are changing it back into the richest kind of food for the next crop of plants that give us our food and clothing? These little beings of the soil, like people, do not all perform the same kind of work. Some are breaking up the parts of decaying plants, others take those parts and change them into food for growing plants, and still others live on the roots of peas, soybeans, clover, vetch and alfalfa, and collect nitrogen, one of the richest plant foods, from the air and store it up in nodules on their roots.

Do you take an interest in the homes of your chickens, pigs,

calves and dogs and delight in seeing them well fed? Do you enjoy visiting the homes of your boy and girl friends? How should you feel then toward the soil which is the home of a great multitude of our most helpful little friends?

Get acquainted with the soil this month. When you go into the gardens and fields remember that you are looking upon the home of teeming millions of little creatures too small to be seen by the naked eye, it's true, but they are there nevertheless. Remember that to live and do their work well they must have air, water and food just like you. These little friends of ours are now waking up to begin their useful work.

Practical Exercises.—Have on the desk the following: Small portions each of light sandy, dark sandy, light yellow or red clay and dark clay soils. Have pupils take notes on the above story read or told. Call the pupils' attention to the fact that the dark color in each case is due to the presence of decaying vegetable matter. Close examination may reveal small particles. The dark soils are the homes of a larger number of germ friends.

Correlations.—Language: From the notes taken on the Life in the Soil story have the members of the class develop either an oral or written story of their own.

Drawing: Have each pupil prepare a large outline map of the school district. Locate the types of soil as indicated on the soil survey map of the county or section.

Geography: Locate the school and church buildings, the main roads, the principal streams, the village or town, the mills, the railroad, if one, and telephone lines on the district map. This map should be carefully preserved for use this month.

History: In connection with Maryland history answer the following questions: Do you live in an old settled community or a comparatively new settled community? Are there any worn-out soils in the community? Are they used for pastures? Are there any such places being improved? How?

Arithmetic: Find out the approximate number of acres of land too poor for cultivation on the farms represented in the class, also the yield per acre in various crops on good soils. From these facts develop problems showing the loss sustained on the farms each year as a result of worn-out soil.

LESSON NINE.

Subject: MANAGEMENT SUGGESTIONS.

Soil.—The preparation of seed beds should be rushed. For all the staple crops the soil should be thoroughly disked and rolled. Crops grown for green manuring should be turned under and the soil thoroughly harrowed.

Crops.—Secure good seed of all kinds of crops. Improved seed are as valuable as improved animals and are cheap at any price. Make plans to improve your own seed. Seed-selection plats are recommended.

Plan the crops for silage, hog pastures, poultry pastures and for green feeds in general. Sow oats in Northern and Western Maryland, and in other parts of the State if the crop has not been sown previously.

Fruits.—Continue spraying. Begin the cultivation of the orchard. Plant grapes and strawberries. Every home should be well provided with small fruits of all kinds.

Gardening.—All kinds of garden operations should be pushed. Every home garden should be provided with a cold frame. By its use early vegetables are insured. The more delicate plants should be started or hardened off in the cold frame before setting in the open. In this way plants may be given a much earlier start than if planting in the open is depended upon.

Farm Animals.—Open the pastures to the live stock, but do not cut off the concentrated food. Look after the work animals. See that they are well fed and that their harness fits them well. Guard against injured shoulders and hocks.

All young animals such as colts, calves, pigs and chickens should receive careful attention. Feed them well and keep down all kinds of vermin.

The cows that were fresh milkers in the fall should not be permitted to drop off in their milk. If properly fed until the pastures are good, they may be continued in full milk flow throughout the summer.

Improvements, Plans and Repairs.—The houses should be screened. Remember that flies are the carriers of typhoid fever germs. Every precaution should be taken to prevent their coming in contact with articles of food. A rigid campaign conducted

at this time against flies goes a long way toward keeping down the number.

As spring approaches clean up the premises and apply lime freely. Pools and ponds of water should be drained. Old wells should be filled. Places containing standing water that cannot be conveniently drained should have frequent applications of oil during the spring and summer months. By such procedures mosquitoes may be prevented from breeding.

MAY.

Introduction.

The lessons for this month conclude the work for the school year. If the session extends into June, some topics should be reserved for that month. On the other hand, if the session closes earlier than May, the teacher should plan to complete all the work of the year. In many instances the older pupils must drop out of school early in the spring to assist with the work of the farm. In such cases the teacher should so arrange the program of recitations as to include as many of the lesson topics as possible before these pupils discontinue their school work.

Management Suggestions for June, July and August are included in the lessons for this month. Special attention should be given such of these as relate to pupils' home projects or club work.

LESSON ONE.

Subject: POULTRY.

Topic: Diseases.

Gapes: Cause.—The gape worm disease is quite prevalent in some sections, especially where chicks are raised on limited areas. Gapes in chickens is caused by worms which attach themselves to the walls of the trachea or windpipe of the birds. The disease is spread by the chicks getting hold of the worms that have been coughed up or passed through the digestive tract of diseased birds. Each of these worms contains thousands of eggs, all of which are ready to produce other worms in a new location. On infected land earth worms are said to act as carriers of this disease.

Symptoms: The symptoms of gape worm disease are so characteristic and so easily recognized that they hardly need description. The main symptom is the stretching of the neck and gasping for breath on the part of the young chick.

Treatment: Preventive measures are most satisfactory. Where the disease is prevalent change runs frequently. If possible,

grow chicks on a new patch each year and cultivate the old runs when not in use. Where this is not practicable, heavy liming of the soil, a bushel to every twenty square feet, might be tried. Keep chicks off the ground when it is wet and earth worms are at the surface.

Isolate all affected chicks to keep them from spreading the disease, and treat them with the old horse-hair, feather or blue grass treatment. A feather is quite satisfactory. Strip off the vane, leaving one-third inch of the tip. Dip this in kerosene or turpentine and insert it in the windpipe, giving it a twisting movement when withdrawing it. This will loosen the worms so that they can be coughed up by the chick.

Another method sometimes used is to put the chicks in a box and place a piece of cloth over it. Then slaked lime dust is rubbed through the cloth and being breathed by the chicks gets to the worms in the windpipe and loosens them up so that they can be coughed up.

Sore Head is a well-known disease that sometimes affects chicks during the warm months of summer and autumn. Its symptoms are very well known and consist of dry sores or scabs about the head parts. The cause is not known but is thought to be caused by very small germs or bacteria. The disease is, as a rule, very mild and easily cured. If the chick is otherwise healthy a few applications of vaseline should cure it. As the disease can be transmitted from chick to chick it is well to separate the sick from the well ones.

The disease often runs through a flock of adult fowls in the early fall. When not accompanied by other diseases simply applying the vaseline a few times will usually cure it.

Mites are often troublesome in poultry houses especially during the warm weather of summer when they breed rapidly. They stay under the roosts and in the cracks and crevices during the day, but at night get on the hens in large numbers. They suck the blood and are otherwise annoying to the birds. Hens bothered with mites cannot be expected to do well. Often they will roost out of doors when the house is very badly infested.

Symptoms: Mites can usually be seen very readily. Their presence is indicated also by little white specks appearing around the roosts and other parts of the house.

Prevention: Paint the roosts once each month with ordinary

kerosene oil. This will keep them away. If they are present you will have to keep after them for some time. Paint the roosts and cracks in the wall where mites are found one or more times each week until they are driven out or killed. It will usually take some time as the mites hide in places hard to reach. Other preparations are sometimes used, but the kerosene oil will do the work.

Fowl Cholera is a contagious disease that affects domestic birds. Formerly most any kind of a diarrhoea among fowls was called cholera, but lately the name has been used more specifically.

Cause: The disease is produced by a small bacterial organism that infests the blood and internal organs. It is hard to tell how the disease is carried but the germs probably get into the system through the digestive tract.

Symptoms: There are no symptoms by which fowl cholera can be recognized with certainty, but when large numbers of fowls have diarrhoea and begin to die rather suddenly, and exhibit the following symptoms, it is well to suspect cholera and begin treatment: Droppings a greenish yellow color, bird assumes a rounded or ball shape with feathers roughened, birds become very weak, and rapidly lose weight. True cholera is often confounded with other diseases with similar symptoms from which it is almost impossible to distinguish without a laboratory examination.

Treatment: Dispose of all birds that die of the disease either by burying deeply or burning. Kill or isolate all affected birds. Avoid spilling their blood where other fowls can get at it, and destroy or burn the dead bodies.

Examine the droppings boards, floor, and runs daily, for the characteristic greenish yellow voidings. If any are found remove these and destroy them and spray the place where they are found with some strong disinfectant, as Kreso, Zenoleum, Napcreol, etc.

Disinfect thoroughly all feed troughs, drinking vessels, grit hoppers, etc.

Give the birds plenty of sour milk or buttermilk, if it is feasible.

Use potassium permanganate in the drinking water. A stock solution can be made by dissolving a teaspoonful of the crystals in a quart of water. Use enough of this stock solution to make the water a claret red.

If the sick birds are to be treated, they should be kept entirely

away from the flock, and given from two to four teaspoonfuls of a half per cent carbolic acid solution twice a day. (Teaspoonful to three pints of water.)

Teachers' Reading.—Farmers' Bulletin 530; Maryland Agricultural Experiment Station Bulletins 153 and 171.

Practical Exercises.—(1) Require the pupils to report as to the following facts with reference to poultry diseases in the community: (a) The name of the disease, (b) the probable causes, (c) the symptoms, (d) the treatments, and (e) the number of fowls lost by death. (2) Poultry club members should familiarize themselves with symptoms and treatments of diseases so as to guard against loss.

Correlations.—Reports required in the practical exercise should be reduced to writing and copied in the class notebooks.

Arithmetic: Estimate the number of chickens lost by death in the community and find their value based on the usual prices paid.

LESSON TWO.

Subject: DAIRYING.

Topic: Marketing Products.

Proper Conditions of Production.—Milk and its products for home consumption or for market should be produced under the following condition:¹

1. Clean, healthy cows kept in clean, light, well-ventilated stables.
2. Stable so constructed as to be easily cleaned.
3. A clean, well-drained barnyard.
4. Clean utensils, thoroughly sterilized.
5. Clean, healthy milkers that milk with dry hands.
6. A small-top milking pail.
7. Immediate cooling of the milk to 50°F. or lower.
8. Storage of milk at a low temperature until delivered or used.
9. A separate place or house for handling milk.
10. An abundant supply of pure water.

Milk.—If the dairyman or farmer is selling milk for city supply and the dealer or consumer knows that he has a well-ventilated and well-lighted barn with a tight floor, and removes the milk to

¹ Farmers' Bulletin 602.

the cooling room as soon as drawn from the cow, this will be encouraged by a higher price for the product, especially if the cows are groomed so as to be free from manure and dirt.

Cream.—When cream is being shipped to the centralizer for buttermaking, the buyer is willing to pay several cents more per pound of butterfat if the cream reaches him sweet instead of sour. The creameryman can make a better grade of butter and a grade that will bring a higher price on the market if his raw material is produced under sanitary conditions and cooled soon after separating, so that it will be sweet or only slightly sour when it reaches the plant. With a very little extra care the cream can be kept clean and sweet. The precautions to be observed are care in milking, and cooling after separating so as to check bacterial growth. When delivered to the station for shipment the can should be kept in a shady place until train time. In hot weather it is the custom of some shippers to wrap a piece of wet burlap around the cans so as to keep the temperature down. There is now on the market a jacket which fits over the can, and the cream will only increase a few degrees in temperature when this jacket is used.

Butter.—When a fine grade of butter is made on the farm there is a greater opportunity to sell it for a price much higher than the market quotations by finding a select trade and making the package attractive. Individuals may be found who are willing to pay several cents above the market for a designated number of pounds each week, packed in jars and covered with a layer of salt paste. Again, grocers are willing to pay above the market price if they are able to secure a definite number of pound or two-pound prints wrapped in parchment paper and enclosed in a carton. As a general rule, people are willing to pay well if the product is high class and placed in their hands in a handy and attractive package.

Textbook References.—Nolan, pp. 100–104.

Teachers' Reading.—Farmers' Bulletins 541 and 602; Maryland Agricultural Experiment Station Bulletins 181 and 187.

Practical Exercises.—(1) How many gallons of milk are shipped from the community each week? How many pounds of cream or butterfat? How many pounds of butter? What is the prevailing price paid for each product? Have the pupils collect the foregoing information by making inquiry at their homes and at

the homes of neighbors. (2) Have the pupils investigate and report as to the containers used by the farmers of the community in shipping milk and cream; also, in what form is butter molded for market?

Correlations.—Have the pupils record in their notebooks the information secured in connection with the foregoing exercises.

Drawing: Outline the various forms in which butter is molded.

Arithmetic: Find the value of the dairy products sold by the community during one week in May. What would be the amount for the entire month?

Geography: Locate on the map the creameries and markets to which the dairy products are shipped.

History: Is there a local creamery or a farmers' coöperative creamery in the county? When was it established? By whom? Have satisfactory prices been paid for milk? Has the creamery proven a success? If not, why not?

LESSON THREE.

Subject: FARM ANIMALS.

Topic: Removing Horns of Calves. ..

The Importance.—It is considered advisable by many farmers and cattle growers to produce hornless animals. This not only insures against injury to other farm animals and to people, but also reduces the possibility of injury in shipping.

Removing the Horns.—Examine the calf's head from time to time until the horns can be located with the hand. The budding horn can be found usually when the calf is from one to two weeks old. Clip away the hair from the horn with a pair of scissors. Next, secure from a drug store a stick of caustic potash two or three inches long and about the size of a pencil. Carefully wrap one end of the stick of potash with paper to protect the hand. Moisten the other end of the stick in water and rub it upon the horn until the surface of the horn begins to peel off. Do not permit the potash to come in contact with any other part of the calf's head as it produces a burn which is very painful and the hair will not grow wherever the caustic potash burns the skin.

The calf should be separated immediately from its mother and other calves. Otherwise the cow may lick the caustic or the calf

may rub its head against the cow's udder or against other calves and thereby produce burns.

When the stick of potash is not in use it should be kept in a tightly-corked bottle.

Teachers' Reading.—Farmers' Bulletin 350.

Practical Exercises.—Those pupils who are carrying on as a project the raising of a baby beef might secure a stick of caustic potash and dehorn the calf. Of course this would apply to the very young calves as set forth in this lesson. For instructions as to the feeding and care of the calf, see Lesson Eight of September. A careful record should be kept as to the amounts of milk and feed given the calf so that the cost of raising it may be definitely determined.

Correlations.—Write letters to the U. S. Department of Agriculture requesting information as to Baby Beef Clubs.

LESSON FOUR.

Subject: VEGETABLE AND FRUIT GARDENING.

Topics: (1) Planting and Cultivating Vegetables;
(2) Picking, Packing, Crating and Cultivating Strawberries.

Planting in the Open.—Sweet corn, muskmelons, watermelons, okra, and squash should be planted this month. Continue to plant beans. In Northern and Western Maryland this is the proper time to begin planting beans. Sweet corn seed should be planted two inches deep in drills 3 feet apart. Thin to a single stalk every 10 to 15 inches. For home use there should be successive plantings of sweet corn every two or three weeks until far into the summer. Among the varieties recommended are Golden Bantam, Adams Early, Country Gentlemen, and Stowell's Evergreen. Sweet corn should receive about the same cultivation as field corn.

Okra should be planted in rows 3 to 5 feet apart depending on the variety. Dwarf varieties require less distance and the large varieties greater distance. The plants should be thinned to 18 to 24 inches in the row. Give frequent shallow cultivations until the plants are nearly grown. Some of the leading varieties are White Velvet, Dwarf Green Prolific, Perkins Mammoth, Long-Podded and Lady Finger.

Cucumbers, muskmelons, watermelons and squashes require good soil and an abundance of well-rotted manure. The seed may be planted in rows or in hills. When planted in rows a deep furrow should be made and manure scattered along the furrow, turning fresh soil over the manure before planting the seeds. If the seeds are planted in hills, an excavation should be made and this filled with manure. Cover the manure with good soil. Cucumbers should be planted in rows 5 feet apart and thinned to stand 12 to 18 inches apart. If planted in hills they should stand 4 feet apart each way. The musk melon is planted in the same general way as cucumbers, but should have greater distance. They may be planted in drills 6 feet apart and 2 feet apart in the row. If planted in hills they should be 6 feet apart each way. Among the good varieties are Rocky Ford, Netted Gem, Emerald Gem, Eden Gem, Jenny Lind, and Paul Rose. Watermelon seed should be planted in rows 8 to 10 feet apart and thinned to single plants 3 feet apart; or planted in hills 8 to 10 feet apart each way. The same preparation should be made as in case of cucumbers. Among the leading varieties are Kleckley Sweets, Florida Favorite, Georgia Rattlesnake and Tom Watson. There are two types of squashes—bush varieties and running varieties. In the case of the former they should be planted in hills 4 feet apart each way, and the running varieties 8 to 10 feet apart each way. Some good varieties are Hubbard, Boston Marrow, Delicious, and Summer Crook Neck.

Cucumbers, muskmelons, watermelons, and squashes should be given frequent shallow cultivation until the vines fill most of the space between the rows. After this keep the weeds pulled out by hand.

Transplanting.—Eggplants should be set 18 to 24 inches apart in rows 3 feet apart. New York Improved Purple, Black Beauty, and Florida High Bush are good varieties.

Pepper plants should be set 15 to 18 inches apart in rows 2½ to 3 feet apart. Some of the leading sweet pepper varieties are Ruby King, Chinese Giant, Sweet Spanish, Bell or Bull Nose. The leading varieties of hot peppers are Long Red Cayenne, Tobasco, and Red Chester.

Tomato plants should be set 18 inches apart in rows 3 feet apart if they are to be pruned. If the plants are not to be pruned or staked, they may be planted 3 feet apart in rows 4 feet apart.

It is generally considered advisable to prune and train to stakes as plants so treated are healthier and more easily cultivated. The fruit will also be earlier and more uniform in size. Soon after the plants are set a stake should be driven near each one. In tying plants to the stake care should be exercised not to injure them. To keep the plants properly pruned go over the patch once every ten days and remove all shoots starting between the leaves and the stem. Light surface cultivation is necessary for eggplants, peppers and tomatoes. Some good varieties of tomatoes are Bonny Best, Chalks, Early Jewel, Greater Baltimore, Red Rock, Globe, Beauty, Acme, and Stone. The Stone variety is recommended for canning.

Sweet potatoes may be drawn and set this month. Broad ridges should be thrown up by a plow and the plants set on these. If planted in hills the plants should stand 24 to 30 inches apart each way. If planted in rows or ridges the plants should stand 14 to 18 inches apart in rows 3 feet apart.

Garden Tools.—Wherever possible one-horse cultivators should be used. Where this is impossible, use wheel hoes. Among the important tools are spading forks for preparing beds, dibbles and trowels for transplanting, hand weeders for small plants in beds, weed hooks, rakes and hand hoes.

Strawberries.—Instructions for picking, packing, crating and shipping were given in Lesson Seven for September. This lesson should be reviewed.

During the growing season the soil should be thoroughly cultivated to keep it loose and friable. This condition of the soil is beneficial in several ways. It allows the air to penetrate the soil which is necessary as roots need air; it retains moisture in the soil by preventing rapid evaporation from the surface; it assists in breaking down plant food; and it keeps the ground free from weeds which rob the plants of moisture.

Textbook References.—Nolan, pp. 283-286, 277-279; Buffum and Deaver, pp. 147-149; Burkett, Stevens and Hill, pp. 101-107; Davis, pp. 174-176.

Teachers' Reading.—Farmers' Bulletins 198, 255, 324 and 647; Maryland Agricultural Experiment Station Bulletins 124, 160, 180, and 182.

Practical Exercises.—(1) Tomato club members should prepare the ground and set their tomato plants. Secure and set up the

stakes if the plants are to be trained and pruned. (2) Have the members of the class make a list of the various vegetables grown in the gardens of the community. Group them under the following heads: (a) Roots eaten as food, (b) leaves eaten as food, (c) fruit eaten as food, (d) seed eaten as food. (3) Require the members of the class to make a list of the tools employed in cultivating the home garden.

Correlations.—Describe and make drawings of garden tools.

Arithmetic: If tomato plants stand 18 inches apart in the row and the rows are 3 feet apart, find the number of plants required to plant one-tenth of an acre.

If potato plants stand 30 inches apart each way, find the number of plants necessary to set an acre.

LESSON FIVE.

Subject: CROPS.

Topics: Planting, Fertilizing, and Cultivating Corn.

Planting.—Extensive investigations show that there is practically no difference in yield whether corn is planted in hills (checked) or in drills, providing it is distributed correctly and the same number of stalks per acre are produced. Checked corn is much easier kept free from weeds, requires less hoeing, and under most conditions where the land is not too hilly this method of planting is the most satisfactory. On very hilly fields planting in drills is in most cases the better.

The depth of planting, necessarily depends upon the condition of the seed bed, the soil and weather. It has to do only with the plant getting properly started and in this way may have some bearing on yield. The depth of roots is not materially affected by the depth of planting. On stiff clay soil, with a properly prepared seed bed and normal weather, corn should not be planted over 2 inches deep, and if the season is wet, planting 1 to 1½ inches deep is better. On the other hand, if the weather is dry and the seed bed poorly prepared better germination will be secured by planting over 2 inches deep. Deeper planting is also necessary in light loamy or sandy soils.

Planting should not begin until the soil has warmed up to a temperature of about 60°F. So much, however, depends upon the weather before and after planting, and also upon the character

WHAT AN ACRE OF CORN WOULD PRODUCE IF THERE WERE NO MISSING
PLANTS AND IF EVERY STALK BORE ONE EAR.

DISTANCE APART OF HILL	NO. HILLS PER ACRE	NO STALKS IN HILL	NO. STALKS PER ACRE	YIELD OF CORN PER ACRE IN BUSHELS	
				When av. wt. of ear is 8 to 10 lbs.	When av. wt. of ear is 1 lb.
3 ft. 9 in. x 3 ft. 9 in.....	3,097	2	6,194	70	88
3 ft. 9 in. x 3 ft. 9 in.....	3,097	3	9,291	106	132
3 ft. 6 in. x 3 ft. 6 in.....	3,555	2	7,110	81	101
3 ft. 6 in. x 3 ft. 6 in.....	3,555	3	10,665	122	152
3 ft. 9 in. x 3 ft. 6 in.....	3,318	2	6,636	76	95
3 ft. 9 in. x 3 ft. 6 in.....	3,318	3	9,954	114	147
3 ft. 9 in. x 3 ft.....	3,872	2	7,744	89	111
3 ft. 9 in. x 3 ft.....	3,872	3	11,616	133	166
3 ft. 9 in. x 20 in.....	6,997	1	6,997	80	100
3 ft. 9 in. x 18 in.....	7,744	1	7,744	89	111
3 ft. 9 in. x 16 in.....	8,712	1	8,712	100	125
3 ft. 9 in. x 14 in.....	9,956	1	9,956	114	147
3 ft. 9 in. x 12 in.....	11,617	1	11,617	133	166
3 ft. 9 in. x 10 in.....	13,939	1	13,939	159	199
3 ft. 9 in. x 8 in.....	17,424	1	17,424	199	249
3 ft. 6 in. x 20 in.....	7,467	1	7,467	85	106
3 ft. 6 in. x 18 in.....	8,250	1	8,250	94	117
3 ft. 6 in. x 16 in.....	9,335	1	9,335	107	134
3 ft. 6 in. x 14 in.....	10,669	1	10,669	122	152
3 ft. 6 in. x 12 in.....	12,446	1	12,446	143	179
3 ft. 6 in. x 10 in.....	14,934	1	14,934	171	214
3 ft. 6 in. x 8 in.....	18,671	1	18,671	213	267

of the seed bed, that no definite rule can be given. Investigations have shown little beyond that of the old Indian sign, which is, "plant corn when the leaves of the oak trees are as large as squirrels' ears."

The number of stalks per hill or the distance apart in the row if planted in drills depends largely upon the variety, the season and the fertility of the soil. If an exceptionally high yield is desired, and the fertility of the soil is provided for, the planting must be thicker than the common practice of planting two stalks in the hill, 3 feet 9 inches by 3 feet 9 inches; for when planted in such a manner with no stalks missing at harvest time and each stalk bearing one ear weighing eight-tenths of a pound (the aver-

age weight of ears for a good crop) the yield would be only 70 bushels per acre. On the other hand, if the supply of moisture during July and August should be far below that required, then thicker planting would reduce the yield. The above table shows what may be expected in yield at different rates of planting, provided there is sufficient fertility and moisture to produce a good crop.

Fertilizer.—Stable or barnyard manure is by far the best fertilizer for corn, but even this cannot make up in one year all the deficiencies of poor soil, and if an exceptionally high yield at a minimum cost of production is desired, the soil must be fertile to start with. Experiments at the Maryland Agricultural Experiment Station show that fresh manure applied in the fall or early winter and plowed under in the spring gives better yields of corn than when applied the latter part of the winter or spring. Rotted manure applied in the spring gave better results than fresh manure.

As a rule, commercial fertilizer when applied alone to corn gives less profit than when applied to other crops. Much, however, depends upon the weather and composition of the fertilizer. In a dry season heavy applications of commercial fertilizer may reduce the yield but in a wet year bad results seldom occur and often profitable returns are secured. At the Maryland Agricultural Experiment Station the best results have been secured when the fertilizer was used in combination with stable manure, especially was this true when kainit was used with the manure. Other investigations show that a complete fertilizer when applied to corn usually gives the best results. Among the complete fertilizers those high in nitrogen give the highest yields, and in a dry season are least apt to cause "firing."

Cultivation should be thorough; it should begin early, and when necessary continue until after the tassel or even the ear appears. No rule can be given for the number of times corn should be worked, because, in some cases four times may be sufficient, and in other cases eight or ten workings may not be too much; weather, weeds, and soil conditions are the only guides.

If, after planting and before the plants have pushed through the ground, heavy rains form a hard crust, the field should be gone over with a spike-tooth harrow or weeder.

This is also an excellent treatment after the corn is up and even after reaching a height of three inches or more. Care, however,

must be taken that the harrowing is done when the soil is in proper condition; little good and often injury resulting when land is too wet or too dry.

The cultivator should be started as soon as conditions will permit, not waiting until weeds show up. The best way to keep the weeds in check is never to let them get started, and the nearer each working is done at the proper time the fewer will be the number of cultivations necessary. Shallow cultivation is preferable at all times; if, however, the ground is hard or compact and weedy the first cultivation should be deep and close to the corn; but when the plants have reached a height of 6 or 8 inches the cultivations should be shallow, running the shovels not more than three inches deep. After this period of growth the lateral roots spread rapidly in every direction, soon ramifying through all the soil between the rows and the plants. Under normal conditions a large portion of the roots develop near the surface so that cultivating 4 inches deep may destroy 50 per cent more roots than 3 inches deep.

It must be borne in mind that the destruction of weed is not the only reason for cultivating, breaking a hard crust to allow the air to penetrate the soil, and to conserve the moisture is often equally as important as killing weeds.

Textbook Reference.—Davis, pp. 140-142; Burkett, Stevens and Hill, pp. 197-202; Buffum and Deaver, pp. 103-105; Nolan, pp. 267-272.

Teachers' Reading.—Maryland Agricultural Experiment Station Bulletins, 141, 165, and 190; Farmers' Bulletins 400, 414, 537, and 617.

Practical Exercises.—(1) Corn club members should plant their corn plats this month. The seed bed should have been thoroughly prepared beforehand. (2) Have each member of the class report as to the kind of corn planter used at home. What is the name of the planter? What are the advantages? The disadvantages? (3) Make a list of the varieties of corn being planted on the farms of the community. Has the seed corn been tested at the home of each member of the class? Have the corn club members tested their seed? If not, why?

Correlations.—All reports in connection with practical work should be submitted in writing.

Arithmetic: If the average weight of the ears of corn grown on

an acre is eight-tenths of a pound, how many ears required to produce 100 bushels? How many stalks each producing one ear? How many hills with two stalks in a hill? If the acre is in the form of a square how many rows are there if they are $3\frac{1}{2}$ feet apart? How many hills in a row? What is the average distance between the hills?

LESSON SIX.

Subject: NATURE STUDY.

Plants.—Have the pupils prepare in their notebooks a table similar to the following and use it for tabulating facts with reference to orchard and forest trees as indicated by the column headings. A large placard bearing such a table might occupy a conspicuous place on the wall of the schoolroom. As the facts are collected have them entered in the proper column.

TABLE OF PLANT FACTS.

NAME OF PLANT	ORCHARD OR FOREST	DATE BLOSSOMS FIRST APPEAR	DATE BLOSSOMS BECOME COMMON	DATE LEAVES FIRST APPEAR	DATE LEAVES BECOME COMMON
.....
.....
.....
.....
.....
.....

Study the strawberry plant and fruit using the following outline:

1. How should strawberries be planted—in rows or hills? How far apart should rows be? How far apart should plants stand in the row?
2. From what do strawberry plants grow—seed or runners?
3. Examine a strawberry plant in class. Are the roots fleshy or branching? How are the leaves arranged? How many leaflets in each group?
4. Examine a strawberry blossom. How many parts has the hull or calyx? How many parts has the blossom or corolla? Is there a green button in the center of the blossom? What is it? Are the blossoms found in clusters? Do they all open at the same time? What parts of the flower fall away and what parts remain? What insects visit strawberry blossoms? In what way are they helpful?
5. Examine several ripe strawberries. Are they all the same shape and color? What are the specks on the surface of the berry—seed? Is the berry the same color on the surface as it is within? Name the varieties of strawberries grown in the community.

Animals.—Fly: The pupils should be taught with great emphasis the danger from flies. This is the time of year to begin combating them. Each fly destroyed now represents thousands later in the summer. All windows and doors of the house should be screened. Study the fly after the following outline:



FIG. 1. THE HOUSE FLY.

1. Locate the fly's eyes. How many are there? How do they appear?
2. How many wings and what color—transparent?
3. How many legs? Number of joints of each?
4. Can you see the fly's tongue? Can it be felt when the fly eats from the hand?

5. How does the fly carry disease? What diseases do flies carry?

6. Where do flies lay their eggs?

(See Farmers' Bulletin 679.)

Mosquito: Study the mosquito and emphasize the importance of keeping the premises free from them. These pestiferous insects soon begin to put in their appearance if preventive measures are not taken. Instruct the pupils to rid their premises of all discarded tin cans, jars, buckets, and the like. They should drain pools of water and fill up old wells. Standing water that cannot be drained should have its surface covered with oil. Use the following outline in studying the mosquito:

1. Collect specimens of all the kinds of mosquitoes that can be found and bring them to school in bottles.

2. Name and describe each kind.

3. When at rest which kind is short and humpbacked? Which stands with hind legs in the air?

4. Get a small bottle of stagnant water containing wrigglers (wiggle tails). Examine these closely. These are larvae of mosquitoes.

5. Why does oil poured on the surface of water kill the larvae of mosquitoes?

(See Farmers' Bulletin 155.)

Birds: Make a list of the birds that may be seen this month. Note the absence of winter residents; also the reappearance of summer residents. Do birds appear in pairs? Are they building nests? Where are the nests located? Does the source of food supply have anything to do with the locations of the nests? Do locations of nests afford natural protection for the birds and their young?

See Department of Agriculture Bulletin 305.

Textbook References.—Nolan, pp. 32–34; Davis, pp. 207–212.

Practical Exercises.—Carrying out the instructions in the foregoing exercises provides considerable work outside the classroom. In addition, the pupils should collect and mount a large number of insects. (See Farmers' Bulletin 606.)

Correlations.—Language: Have the pupils write a description of a strawberry plant.

Drawing: Make drawings of strawberry leaves and berries; also sketch flies, mosquitoes and other insects.

LESSON SEVEN.

Subject: MANAGEMENT SUGGESTIONS FOR MAY.

Soil.—Winter cover crops should be turned if this work has not already been done. Be careful not to turn over completely the furrow slice. Instead, the slice should rest against its neighbor. Reasons for this were given in the lesson on green manuring.

Crops.—Begin planting corn. Good seed beds should be prepared as thorough preparation is more than half the battle in growing a cultivated crop. If there are areas on the farm that are run down or lack humus, plant them to cow peas, soybeans or velvet beans. These plants not only store nitrogen in the soil but add other fertilizing elements and vegetable matter when turned under.

Orchards.—Continue spraying all trees using Bordeaux mixture and arsenate of lead. The grape vines should receive liberal applications of Bordeaux mixture.

Gardens.—Set out tomato, potato, pepper and eggplants. Plant melons, cucumbers and squashes. Keep up a continuous shallow cultivation of all garden crops. Plan for a continuous supply of beans and sweet corn. Keep an eye out for potato beetles and combat them with arsenate of lead or Paris green.

Farm Animals.—Refer to the table of succession of crops for hogs in Lesson Four of September. It will be noted that now is the time to plant rape, cow peas, and corn. Sufficient amounts of these crops should be planted to insure ample grazing in late summer and early fall.

(For particular information with reference to rape and cow peas see Farmers' Bulletins 164 and 318.)

Begin marketing the early chickens. Broilers put on the market at this season command a fancy price. Look after the health of young chickens. See that they have fresh water and wholesome food; also that brooders and brooding coops are kept dry and in a sanitary condition. A liberal amount of lime should be used around poultry houses and runs.

Provide a special room or small house for milk and its products. Such a place should be cool and clean. Running water should be provided. For instructions as to the care and attention of fresh milkers and young calves review Lesson Eight for September.

Improvements and Repairs.—Drain all swampy places, keep the stables clean, mow the weeds and screen the doors and windows. Provide conveniences for the kitchen. Make or purchase a fireless cooker.

LESSON EIGHT.

Subject: MANAGEMENT SUGGESTIONS FOR JUNE.

Soil.—Cultivate often and shallow.

Crops.—Wheat should be harvested this month. Red clover should be mowed when in full bloom and stored for hay. Fallow land should be plowed and planted to peas, soybeans, or sweet potatoes. If potatoes are planted, apply liberally fertilizers rich in potash. Potatoes may be grown from cuttings of vines or slips. Potatoes grown from cuttings do not rot so badly as from slips.

Fruits.—Clean out strawberry beds or cultivate the patch. If the plants have been bearing for two or more years reset them or plant new ones. The orchard should be planted to cow peas or some truck crop. Do not neglect the spraying. As fruit ripens, can the surplus.

Gardens.—Keep up a succession of garden crops. Continue to plant beans, tomatoes and sweet corn. Tomatoes should be staked and pruned. The shoots appearing in the axils of the leaves should be removed as rapidly as they appear. All garden crops should be cultivated often and shallow. Horse cultivation is best. If this is not practicable, wheel hoes should be secured. A small outlay in good garden tools saves time and labor.

Pastures.—Pastures should be carefully looked after. Keep them free of bushes, briars and weeds. If the water supply in the pasture runs low, see that all animals are properly provided for. Every permanent pasture should have ample shade for the live stock. If there is not a sufficient number of trees, temporary sheds should be made.

Farm Animals.—Guard carefully the health of the hogs and poultry. If hog cholera breaks out in the community get in touch with the College of Agriculture at College Park, Md., and prepare to inoculate against the disease. Prompt action is necessary in such cases.

Keep all work stock in good condition. See that collars and harness fit properly. It is easier to prevent sores caused by rubbing than it is to heal them. As the hot season advances cut some of the corn out of the ration and substitute oats and a good quality of legume hay.

LESSON NINE.

Subject: MANAGEMENT SUGGESTIONS FOR JULY.

Soil.—Do not permit the stubble to lie idle. If it is to be succeeded by another grain crop in the fall or some cultivated crop in the spring, plant the stubble land to cow peas or soybeans. These crops not only improve the soil but may be used for grazing or for silage.

Continue frequent light, shallow cultivation of garden and field crops. This kind of cultivation causes moisture which is especially important at this season as the plants are large and require a great deal. Remember that plant food is useless without moisture to enable it to be carried to the plant. Do not stop the cultivation of corn too soon. In fact, cultivation should be continued until the winter cover crop is planted, which should be the latter part of July or during August.

Gardens.—Keep the garden going. Fall vegetables such as turnips, potatoes and cabbage should be started this month.

Can all the surplus vegetables and fruits. Do not permit anything to go to waste that can be saved for winter use.

Harvesting.—Haul in and thresh the grain. Save all the hay possible. Grain straw should be stacked in a dry place or baled. The quality of hay is preserved if it is carefully stacked or baled.

Farm Animals.—Keep all animals thrifty by furnishing them with pure water and a liberal amount of succulent food. If the pastures begin to dry up, feed work animals and dairy cows fresh hay. The cows should not be permitted to drop off in their milk.

Save all the eggs possible. If they do not command a reasonable price, preserve them for home use at a time when there is a good price for the supply of fresh eggs. Look after the health of the poultry. Keep the houses and runs well limed. If a disease breaks out, separate the affected chickens from the others and give them treatment. For causes, symptoms and treatment of poultry diseases see Farmers' Bulletin 530.

Improvements and Repairs.—Clean up weed patches, ditches, and terraces. Keep the premises free of places where flies and mosquitoes can breed. Keep the screens in good condition.

LESSON TEN.

Subject: MANAGEMENT SUGGESTIONS FOR AUGUST.

Soils.—Cultivation of late field and garden crops should be continued.

Crops.—Begin sowing crimson clover and rye for cover crops. Prepare the land and sow alfalfa. The seed of a leguminous crop should be inoculated if this crop has not been grown on the land before. Make and store hay.

Gardens and Orchards.—Look after the fall gardens. Plant lettuce, radishes, spinach and the like. Can tomatoes, beans, sweet corn and other vegetables. The surplus of all kinds of fruits, such as apples, peaches, pears, and grapes should be preserved in some form. Canned fruits, jellies, preserves, and the like should be found in abundance in every farm home.

The tomato club members should keep up with the ripening fruit in the matter of canning.

Farm Animals.—The hogs intended for fall fattening should be kept in a thrifty condition. They should be in a good pasture now. If a succession of crops is maintained for the hogs, rape, cow peas, soybeans or red clover should be available for grazing. An abundance of rape and turnips should be grown for late fall and winter feeding. Sows that are to drop fall litters of pigs should be kept on good pastures and fed a reasonable amount of concentrated food.

Give the hens and pullets good attention and feed. As soon as the moulting period is over the hens should be fed properly to encourage egg production.

If pastures should become dry give the cows some green feed. Cows that are to drop fall calves should be kept on good pastures or fed succulent food. They should also be given a small amount of concentrated food.

Improvements and Repairs.—Lay in a supply of winter wood and build good, dry walks about the premises. Keep the premises and the farm cleaned up. Whitewash the outbuildings and

apply lime freely about poultry and hog houses. If necessary, paint and make additions to the farm buildings.

Plan permanent improvements such as new fences, tile drainage, and silos.

Take a vacation. Attend farmers' meetings and visit the homes of successful farmers with a view of studying their methods and equipment. Be open-minded and progressive. Learn by the successes and failures of other people.

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